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THE AMERICAN GAS LIGHT JOURNAL

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DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE

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Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Nineteenth Annual Meeting, Ohio Gas Light Association.

OHIO GAS LIGHT ASSOCIATION,
OFFICE OF THE SECRETARY,
DELAWARE, O., Feb. 20, 1903.

The Nineteenth Annual Meeting of the Ohio Gas Light Association will be held at Cincinnati, O., March 18th, 19th and 20th, 1903.

The President, Mr. C. W. Andrews, of Hamilton, O., will call the meeting to order on Wednesday, March 18th, at 9:30 A.M., in convention hall at the Grand Hotel, the headquarters.

The Executive Committee have again made a radical departure in their programme, in that a Question Box Editor has been appointed, in the person of Mr. Henry L. Doherty. Written questions have been asked and answers returned, and this department will undoubtedly be one of the most interesting features of the meeting.

The following papers will be presented:

"Domestic Heating by Gas," by Mr. Donald McDonald, Louisville, Ky.

"Natural Gas as a Factor in the Artificial Business," by Mr. F. W. Stone, Ashtabula, O.

"Construction and Operation of Gas Benches," by Mr. W. A. Baehr, Denver, Col.

"Progress Department," edited by Mr. Irvin Butterworth, Denver, Col.

"Wrinkle Department," edited by Mr. E. E. Eysenbach, St. Paul, Minn.

"Novelty Advertising Department," edited by Mr. B. W. Perkins, South Bend, Ind.

An opportunity will be given any of the speakers at the meeting to correct their remarks before leaving Cincinnati, but not after, as all reports will be turned over to the printer immediately after the adjournment of the meeting.

On Wednesday evening, March 18th, the Association will be the guests of the Cincinnati Gas and Electric Company at a theater. On Thursday, March 19th, the Convention will be the guests of the Hamilton-Otto Coke Oven Company. A special train will leave Cincinnati, at 12:20, on a trip to inspect the coke ovens at Hamilton. The members will be entertained at luncheon at the F. & L. Kahn & Bros. new stove factory. Returning from Hamilton the train will arrive in Cincinnati about 6 o'clock. In the evening the Association will be the guests of the Stacey Manufacturing Company and the United States Cast Iron Pipe and Foundry Company at dinner.

The Grand is conducted on the American and European plans, and the following rates have been secured for the meeting: American plan—$3 to $10 a day. European plan—$1.50 to $7 a day. The Grand hopes to entertain all of the Association, and will put forth every effort to make the members comfortable. The most satisfactory quarters are always obtained by writing in advance to the hotel people.

Through the courtesy of the lines constituting the Central Passenger Association, persons attending the meeting will be granted special rates for transportation under the certificate plan; viz., full fare going,

and one-third fare returning by the same route. Be sure to obtain a railroad certificate when buying your ticket for Cincinnati.

The Secretary will furnish application blanks for membership, and any further information which may be desired relative to the meeting. T. C. JONES, Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, Western Gas Association.

WESTERN GAS ASSOCIATION,
OFFICE OF THE WRINKLE DEPARTMENT,
721 Citizens Building, Cleveland, O.

To the Members of the Western Gas Association: The Wrinkle Department is now ready to receive contributions for the 1903 collection, and I would thank you to please send a sketch or description of any new device or method you may have to the above address.

Any sketch, photograph or drawing, accompanied by a written explanation, of a new idea will be gratefully received, and it is hoped that you will comply promptly by favoring us with a contribution.

Respectfully, W. E. STEINWEDELL,
Editor Wrinkle Department.

BRIEFLY TOLD.

EDITOR DOHERTY EXPLAINS.—The following letter from Mr. Henry L. Doherty, Editor of the Question Box, Ohio Gas Light Association, speaks for itself—it is dated, Denver, Col., February 28th:

To the Editors AMERICAN GAS LIGHT JOURNAL: In my work as Editor of the Question Box for the Ohio Gas Light Assocration, I have not succeeded in giving, by my mailed communications, the impression I wished to convey, and I ask the assistance of your JOURNAL for the purpose of an explanation. I have attempted to address and secure the co-operation of each member of all the Associations. Many of those so addressed have expressed surprise, and have written back calling my attention to the fact that they are not members of the Ohio Gas Light Association, while others have evidenced a desire to assist, but seemed to think they had been addressed by mistake. We want your readers to know that everybody interested is asked to participate in the work.

In my communication of February 9th, I asked that answers be sent in by February 20th, but I did not mean to convey the impression that answers received after that date would not be welcome. I was trying at that time to get the answers in time to print the Question Box in pamphlet form and send it out prior to the convention; but I find this will be impossible, and, therefore, answers to questions will be gladly received at any time prior to the convention, although we would like to have them as soon as possible. Many of those addressed have replied that the time was too short for them to attempt to answer any of the questions, and I want to reach all of the gas fraternity and impress upon them the fact that we want their answers as soon as we can get them, but we want their answers later if we cannot get them earlier, and want to put the material in the hands of the printer immediately.

The Question Box is making a "hit," and I have received letters from gas men all over the country stating that they were planning to attend the convention. The answers are coming in somewhat tardily but in great numbers, and contain very interesting and valuable information. Many are in direct contradiction to others, and unless the differences of opinion can be adjusted the controversy may result in the violation of the peace of the Holy (?) City of Cincinnati.

Many non-members have written to ask if they can attend the convention, and to save myself an individual response to these inquiries, I would like to have your JOURNAL say that the Association extends a hearty invitation to all, who are interested, to attend the meeting, which will be held in Cincinnati, O., March 18th, 19th and 20th.

Whatever valuable information is brought out by the Question-Box will be shared by the entire gas fraternity, and we, therefore, feel warranted in asking the assistance of the entire gas fraternity in securing answers, information and data relating to these questions; so please, Mr. Editor, ask your readers to "buy a stack of chips" and get into the game. We want all the answers we can get.

Yours fraternally, HENRY L. DOHERTY, Editor.

THE voters of Berlin, Ontario, have assented to the purchase, for operation on municipal account, of the gas and electric properties of the Berlin Gas Company.

THE CINCINNATI MEETING OF THE OHIO GAS LIGHT ASSOCIATION.—The members of the Ohio Gas Light Association are to be congratulated over the outlook for their 19th annual meeting, which is to be held this year in Cincinnati, on Wednesday, Thursday and Friday of next week. The official notices so well put together by the Association's efficient and indefatigable Secretary, Mr. T. C. Jones, of Delaware, O., as printed in the JOURNALS of recent date, bear complete and convincing testimony to the effect that the meeting cannot be other than of great interest to those who will take part in it. President Andrews, in fact, it seems to us will have the satisfaction of presiding over a meeting that will be the brightest of the many bright ones that grace the Association's record pages. Editor Doherty has done wonders in his development of the Question Box, and we hope his current letter on the subject, which precedes this matter, will be read with the attention that its merit warrants. The official notice printed to-day, contains news of importance in that Secretary Jones and the other gentlemen in charge of the preliminary arrangements announce that the Central Passenger Association has granted the fare and one-third concession for going to and coming from the sessions. Carefully remember the Secretary's admonition to "Be sure to obtain a railroad certificate when buying your ticket for Cincinnati."

NOTES.—

MR. H. B. MAYNARD has resigned the dual position of Treasurer and Superintendent of the Ottumwa (Iowa) Gas Light, Heat and Power Company in order to accept the position of Manager to the Hammond (Ind.) Illuminating Company. His successor at Ottumwa will be Mr. J. L. Davis, of Little Rock, Ark.

MESSRS. A. M. MOSTALL, of Millville, N. J., and Messrs. H. McNeal and R. M. Anderson, on behalf of the South Jersey Gas, Electric and Traction Company, have filed articles incorporating a Company that proposes to supply gas in Pitman, N. J. It is capitalized in $50,000.

AT the annual meeting of the shareholders in the Hollister (Cal.) Light and Power Company, the following officers were chosen: Directors, W. R. Porter, T. S. Hawkins, N. C. Briggs, R. P. Lathrop, C. H. Wagner, Wm. Palmtag and R. Shaw; President and Manager, Wm. Palmtag; Vice-President, T. S. Hawkins; Secretary and Assistant Manager, R. Shaw; Treasurer, Farmers and Merchants Bank.

THE following message, dated Gibraltar, 18th ult., is here repeated to let the Captain's friends know where he was then "at:" "Hello, 'Tom'! All well; improving daily. Huge storm on for past 24 hours, and Spain looks sad. Love to everybody.—Capt. Harry."

THE residents of Windsor Locks, Conn., are making strong protest against granting the right to the Windsor Locks Electric Light Company to manufacture and distribute gas in the towns of Windsor Locks and Warehouse Point. The opposition is based on the belief that the Electric Company means to secure the right for the purpose of keeping others out of the named gas field, and that it has no intention of actually constructing a gas plant.

Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

A Correction with an Explanation.

CONNELLY IRON SPONGE AND GOVERNOR CO.,
395 Broadway, N. Y., March 5, 1903.

To the Editors AMERICAN GAS LIGHT JOURNAL: We note in an esteemed competitor's advertisement the following: "The only inclined retort installation in the world with 9 retorts per setting 20 feet long (in action) are erected on this system." (Graham's.)

The Drakes', Limited, erected at Middlesborough, England, in 1894, 6 benches of 6's (slopers) 20 feet long; in 1896, 6 benches of 6's, as above: and, in 1897, 10 more benches of 6's, all as above and in the same house. In 1900 they erected at the same works for the same Company 16 benches of 9 retorts each, all of the retorts being 20 feet long, which the writer saw in successful operation, in November, 1901, and which are in successful operation to-day. Not only this, but the Drakes', Limited, are under contract to replace the 6's with 9's this year.

The above installation of 16 benches of 9's, retorts 24 to 20 inches by 15 inches by 20 feet long, were making over 2,000,000 cubic feet per day, using 17 to 18 per cent. of the coke made in the furnaces. All of the above can be corroborated by writing to Mr. D. Terrall, Engineer; or, to Mr. Corbet Woodall, Consulting Engineer.

Yours very truly, GEO. G. RAMSDELL.

[Official Report—Revised by the Secretary.—Continued from Page 324.]

THIRTY-THIRD ANNUAL MEETING OF THE NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

Held in Young's Hotel, Boston, Mass., Feb. 18 and 19, 1903.

First Day, Feb. 18—Morning Session.

The President—We will now listen to the reports of the Secretary and Treasurer.

Reports of the Secretary and Treasurer.

As Secretary, Mr. Gifford reported that at the last annual meeting there were added to the rolls the names of 10 active and 6 associate members, which brought the membership up to the following, on date of February 17th: Honorary, 9; active, 146; associate, 60; total, 215.

As Treasurer, Mr. Gifford reported that the receipts for the year ended February 17, 1903, were $814.94, that the expenditures were $734.92, and that the balance was $80.02.

The President announced that the Treasurer's report had been duly audited and found correct, after which, on motion of Mr. H. B. Leach, the report was accepted, recorded and ordered placed on file.

The President then called upon the Setretary to read the following

Special Report from the Board of Directors.

To the Members of the New England Association of Gas Engineers: From an examination of the Treasurer's reports for the past 4 years it appears that the yearly surplus of receipts over expenditures will range between $100 and $150. The printing of the "Proceedings" for the years 1900 and 1901, in one volume, cost $515; the net cost will be reduced by the number of surplus copies sold. It is recommended that the "Proceedings" of the present and of the former meetings be printed in book form, and distributed to members and placed on sale, as rapidly as they can be prepared for publication. There can be used for this purpose, of the money available from the library fund, $150 to $200 per annum, and also $100 to $150 per annum from the balance in the treasury of the Association. This will provide for an expenditure of from $250 to $350 yearly on the work of publishing. As considerable time will be required for the preparation of the material, the publication can be carried along as rapidly as the money is available. In the case of some of the meetings, as many as five years can conveniently be compiled in one volume. If any members desire to help the work, additional subscriptions to the library fund would accelerate the completion of the reprint of "Proceedings."

The term "library fund" has been employed to describe the money subscribed, though it was proposed to use most of the money for the republishing of the "Proceedings." The opportunity to secure for the Association a head quarters, and the use of an excellent engineering library in a central locality, in a fireproof building, under exceptionally favorable circumstances, made it seem timely to prepare the question for the consideration of the Association. In the designated annual charge ($100) is included the privilege of the use of the magazines and books of the Boston Society of Civil Engineers; it covers all expense in connection with the use, light and care of the reading room as a headquarters, and provides shelves for the books of the Association. Several members have already offered to furnish a number of volumes of Gas Journals and publications bearing upon our industry.

Of the 220 members of the New England Association, 140 represent 90 New England companies, selling 11,000,000,000 cubic feet of gas per annum. There are, in New England, about 45 companies not represented by membership in this Association; these 45 companies furnish less than 3 per cent. of the total gas supply. The New England Association is better able to make an effective use of a library and headquarters than any other Gas Association. Of our members, one-fourth live or do business within 5 miles of Boston, one-third within 15 miles, one-half within 40 miles, three-fourths within 150 miles. This makes it possible to get the member to the library, or to get the library book to the member, without excessive transportation charges. The scope and character of the library and reading room under consideration are shown in the annexed pamphlet and photograph, which are made a part of this report.

In response to the circular sent to members in December, 1902, the sum of $307 per annum, for a term of five years, has been subscribed and more is assured to the library fund. We recommend the acceptance of the subscriptions, and the use of the fund for the purposes named in the circular of 22d December, 1902, and herein again described. We further recommend:

1. That the Board of Directors be also the Library Committee.
2. That the Library Committee be empowered to make rules for the proper conduct of the library, and to expend from the library fund such sums as may be necessary to carry out these rules.
3. That the Secretary and Treasurer of the Association be also the librarian.
4. That the librarian have charge of the moneys received from the subscriptions to the "library fund."
5. That the librarian report annually to the Association, stating receipts and expenditures.

The circular referred to, dated December 22, 1902, is as follows:

New England Association of Gas Engineers,
Office of the Secretary,
East Boston, Mass., Dec., 22, 1902.

To the Members of the New England Association of Gas Engineers and the Gas Companies of New England: There is offered to the New England Association, by the Boston Society of Civil Engineers, an opportunity to rent space in its library, where books of the New England Association of Gas Engineers may be kept, and at the same time give to our members the privilege of access to its very complete and admirably catalogued library, which has about 5,000 volumes, and there are about 50 engineering periodicals received. Also, our members could have the use of their rooms for purpose of making appointments, letter writing, etc., when in the city.

It is felt by the Directors that if such a place were provided for the safe and convenient keeping of books, our library would soon grow to respectable proportions.

In this connection the matter of publishing our "Proceedings" in book form comes to mind, and it will be noted that, to continue the work as it has been begun, will demand more funds than the present current dues will provide.

In order to provide means to make these desirable ends available, without increasing the annual dues to members, the Directors, at the last meeting, appointed the President and Secretary a committee to solicit subscriptions to a library fund for a term of 5 years, the proceeds of which shall be devoted to the above named purposes.

It is thought $100 per year would provide for headquarters at the Library of the Boston Society of Civil Engineers, leaving $200 available toward publication of our "Proceedings," and for other additions to our proposed library.

If the plan meets with your approval will you kindly fill out, sign, and mail to the Secretary, 26 Central Square, East Boston, Mass., the inclosed blank, stating the amount which you or your company will give annually for a term of 5 years, or such lump sum as you will give for this purpose.

It is very desirable that these replies should be received before the next Directors' meeting, or by January 7th, 1903.

William E. McKay, Pres.
N. W. Gifford, Secy. } Committee.

The catalogue with prospectus of the Library of the Boston Society of Civil Engineers, together with view of the library room proper, is appended:

The Library of the Boston Society of Civil Engineers.

715 Tremont Temple, Boston, Mass.

The library and reading room of the Society is open daily, except Sundays, from 9 A.M. to 5 P.M. Members desiring to use the rooms at other hours can purchase keys from the Secretary.

Among the bound volumes, or the periodicals regularly received, are the following:

"American Architect and Building News."
"American Engineer."
American Gas Light Journal.
"American Institute of Electrical Engineers, Transactions."
"American Institute of Mining Engineers, Transactions."
"American Society of Civil Engineers, Proceedings."
"American Society of Irrigation Engineers, Quarterly."
"American Society of Mechanical Engineers, Proceedings.
"Association of Engineering Societies, Journal."
"Canadian Engineer."
"Canadian Society of Civil Engineers, Transactions."
"Cassier's Magazine."
"Electrical World and Engineer."
"Engineering (London)."
"Engineering Magazine."
"Engineering News."
"Engineering Record."

"Engineering and Mining Journal."
"Engineers' Club of Philadelphia, Proceedings."
"Engineering Association of the South, Proceedings."
"Engineers' Society of Western Pennsylvania, Proceedings."
"Franklin Institute, Journal of."
"Institution of Civil Engineers (London), Proceedings."
"Institution of Mechanical Engineers (London), Proceedings."
"Indian Engineer."
"Iron Age."
"Irrigation Age."
"Liverpool Engineering Society, Transactions."
"Master Car Builders' Association, Proceedings."
"Master Steam Fitter."
"Municipal Engineering."
"Municipal Journal and Engineer."
"New England Water Works Association, Journal of."
"Nova Scotian Institute of Science, Proceedings."
"Ponts et Chaussées, Annales des."
"Power."
"Railroad Gazette."
"School of Mines Quarterly."
"Scientific American Supplement."
"Société des Ingénieurs Civils, de France, Mémoires."
"Street Railway Bulletin."
"Street Railway Review."
"Technology Review."
"Technology Quarterly."
"University of Wisconsin, Bulletin."
"United States Naval Institute, Proceedings."
"United States Patent Office Gazette."
"Worcester Polytechnic Institute, Journal."
"Western Society of Civil Engineers, Journal."
"Zeitschrift des Vereines Deutscher Ingenieure."

There are upward of 5,000 books and pamphlets on the shelves; the card catalogue affords a serviceable guide to the publications. The room is quiet and pleasant, with comfortable chairs and tables. Each man can go to the shelves, look the books over and help himself without waiting for ceremony and attendants to bring him a selected book or two from distant and inaccessible shelves. This personal access to the book stacks accelerates the service.

The library has other possibilities than those of a professional workshop. The room is so attractive and so centrally located that it will always be found a convenient and pleasant place to spend an hour. It is well lighted and cheerful, by day and by night, and is a convenient place to meet friends, or for business engagements. The building is of fireproof construction, and has elevator service.

If a member from out of town desires a quiet place to write a few letters, or to look over some plans, he will find in the library a large table and a supply of stationery ready for use. If he should need a stenographer, he will find one in the adjoining room, who is prepared to serve the public. As a headquarters, the library is attractive and usable in many ways.

Discussion.

The President—What is your pleasure, gentlemen, with respect to this report?

Mr. Allyn—Mr. President, I think the Association is hardly ready to consider the matter at this stage. I move it be received and laid on the table for the present.

Mr. Woodward—I second the motion.

Mr. Prichard—Mr. President, I would like to inquire how long it would take to publish the complete "Proceedings" of the Association.

The President—The committee who looked the matter up thought that at the end of 5 years the "Proceedings" would be about caught up.

Mr. Prichard—I was wondering whether it would be possible to take a subscription among the members and get the "Proceedings" published at once, or before our next meeting. Would it not be possible for us to raise money enough to do that work at once, apart from the other?

The President—An item comes into the matter that needs to be considered—the amount of work that there is getting the volume out. I think Secretary Gifford will probably say that the work of getting out 1900 and 1901 was considerable. We want to keep up with what we are doing now, and also publish the "Proceedings" of the past meetings. Any further discussion?

Mr. Allyn—My object in making the motion was that I considered, as this matter was new to probably seven-eighths of the persons present, they would like to have an opportunity to talk it over among themselves and see whether this was a desirable movement for us to adopt. I certainly did not intend to cut it off entirely, but thought that it might be better to leave it until a later stage of the proceedings. It is well known that a great many of our companies are located at distances apart, and that the opportunity to discuss matters does not exist. It seems to me that at this early stage of our meeting, when we generally go on with the regular work of our Association, it is rather unreasonable to expect that we are prepared to take this thing up and discuss it as we should

Library and Reading Room of the Boston Society of Civil Engineers, Tremont Temple, Boston.

before deciding. It seems to me one of the most important schemes that ever has been devised for the Association, and requires careful consideration.

Mr. J. J. Humphreys, Jr.—Mr. President, I would like to offer an amendment to Mr. Allyn's motion, that this matter be made the first business of the afternoon session. (Seconded.)

The President—The vote will be upon the amendment. Is there any discussion? The amendment is that that this matter, if it is laid on the table in the subsequent vote, become the first business of the afternoon session to-day. (Adopted.)

The President—The vote now comes upon the original motion. (The motion to lay the report on the table, as amended, was adopted.)

COMMITTEE ON NOMINATION OF OFFICERS.

The President—It is customary to appoint a committee to nominate officers for the ensuing year. What action will you take in this respect?

On motion of Mr. McGregor, the President was directed to appoint a Committee on Nomination of Officers for the ensuing year; and the President named Messrs. Charles H. Nettleton, S. J. Fowler and W. A. Learned as such committee.

READING THE PAPERS.

The President introduced Mr. S. E. Baker, of Fall River, Mass., who read the following paper on

METHODS OF BILL COLLECTION.

When a prospective customer makes application for gas to be supplied to his premises, he signs an application in which, briefly stated, he agrees to pay his bills; on the lower left hand corner of the application his occupation is given; this is obtained that we may be enabled to identify a man by his occupation in case a like name appears on our books.

No women's names are taken if there is a man at the head of the household, experience having taught us that sometimes a woman applies for and obtains a meter, while we have on our ledger an uncollected bill against her husband.

Canvassers, complaint men, and all connected with the company thoroughly understand this rule; and all acceptable applications bearing a woman's signature state that she is a widow, or unmarried, in order that the setting of the meter be not delayed.

We seldom require a deposit. Small stores, a traveling show, or a person whose credit is known to be very poor, are the exceptions to the usual custom. The total amount of deposits on our books January 1st, 1903, amounted to $1,308, an average of about 10 cents per consumer.

The meter set and removal card, besides the usual information, has two lines which read: "Moved to," "Moved from;" when a party orders a meter removed without ordering another one set he is asked by the order clerk, in a polite way, as to where he is moving, and this address is entered on the set card. This information enables the collector to locate the person in case any bills have been left unpaid; if the consumer is merely changing his residence and orders a meter at the new address, the old address is entered on the set card on the line "Moved from," so that if our records show that he has received shut-off notices at intervals, or if we have any reason to be doubtful of his willingness or ability to pay we are able to turn to his account and see if it is paid to date or past due.

In our office one man, in addition to other work, has the same relative duties that the credit man of a large commercial house would have. Necessarily he has no ratings, issued by a commercial agency, to guide his judgment, which must be based on his knowledge of the local conditions. The ability and willingness of the people to pay vary greatly in a city in which 86 per cent. of the population is foreign born, or of foreign parentage, as is the case in Fall River. Secondly, as a guide, he has a record book, to which he turns to see if any information is contained in it which it would affect the applicant's credit. This book is arranged like a vowel index for ease in quickly locating a name. When a shut-off notice is sent to a party the name is entered in this book with the date of the notice, the ledger number and folio. If the person is sent frequent shut-off notices a cross is put against the name; if monthly notices are the rule, the name is starred; thus the person has established a record of his credit, which will be a guide—if he wishes to purchase some gas appliances on time.

When a remove order comes before the credit man without a corresponding set order, "collect" is marked on the margin of the card, and a bill with the last reading is attached to the card. The name of the party and the address are then entered in pencil in the record book. If the party pays, the name is erased; if not, an entry in ink is made, giving name and address, and "Owes gas" is written after it. Usually from 10 days to 2 months the name again appears before the credit man on the set card and the payment of the old bill is made a prerequisite to setting the meter; thus bills for fractions of a month, small in themselves but considerable in the aggregate, are saved for the Company.

After the card is stamped with the name of the credit man it is given to the ledger clerk who has the district in charge, who enters on it the size of the meter required, reads carefully the name and address, and is encouraged to offer any advice that his experience may suggest. There is a friendly rivalry between the ledger clerks to keep their ledgers paid up to date, and to lose as small a percentage as possible of the accounts under their charge. To aid them in this, each collector reports directly to the ledger clerk in charge of his district, by whom he is questioned as to ths advisability of sending this or that man a shut-off notice, the reason such a bill is not paid, and such other questions as would naturally occur to one interested in his work; and last, but not least, the collector is kept stirred to a continual state of activity. Stoves in our Company are sold on the monthly payment plan. When the stove is set the bill is rendered promptly and a printed slip is inclosed which reads: "Inclosed find bill for gas stove; the collector will call tomorrow" (here the date is written) "for the first payment." As a great many of our customers are employed in the mills, both husband and wife, we find this notice a great help, the money being usually left with a neighbor in anticipation of the collector's call. If a stove is returned to us, and the cause of the return has any bearing on the credit of the customer, an entry is made in the credit book giving name, date of return of stove, and the words "Stove returned."

Next season during the warm weather, if the party orders a stove, as he very likely will, we have information to guide us in passing upon his order. If an order comes in to disconnect a stove, and no request to set it elsewhere accompanies the remove order, the sales' ledger is consulted to ascertain if the stove is paid for in full, and if not, we act promptly, collecting the balance due or removing the stove.

On looking over our credit record I find entries—a few of which are as follows:

Always in hard luck.
Credit "N. G."
Slow pay.
Render bills promptly, as he always disputes.
Keeps returning goods.
Only fair pay.
Drinking man.
Usually hard up.
Have terms of sale well understood.

These entries enable the credit man to pass upon orders which otherwise would be filled without question—and probably at a loss. All sales of Welsbach supplies are made cash as far as possible, but where the collection is not made on delivery of the goods the bill is rendered promptly and is stamped *Terms Cash.*

This is made CASH: Not on account of any question as to your credit, but because it is impossible for us to open so many small accounts.

It has been our experience that if a Welsbach supply bill was allowed to run 30 days the collection of it was frequently accompanied with friction. The receipt of the goods sometimes being disputed, or if the mantle has become broken, the customer feeling that he ought not to pay for it. If a bill for supplies remains unpaid at the end of 30 days a statement, stamped as follows, is mailed:

Past Due ! ! !

This account has, no doubt, escaped your notice. Will you please favor us with a remittance by return mail, and oblige?

If this brings no results the bill is then given to the collector.

When a meter is removed and the collector has reported that he is unable to collect the bill, a series of 4 notices attached to a statement of the account are mailed at intervals of a week each.

These notices are from "The Sayers Claim File," registered, and are as follows:

Please oblige by an early settlement of this account.

No doubt this account, which is long past due, has escaped your notice. Kindly oblige by an early settlement.

Your attention has been called to this account several times. We now desire to close same without further delay.

> Several demands have been made for payment of this account and, unless it receives attention before ... .it will be placed in the hands of an attorney with instructions to collect with costs.

Final Application.

These notices prove a very efficient aid in collecting doubtful accounts. In theory every gas company reads all of its meters at regular intervals; in practice there are a few each month remaining unread. A memorandum of these meters is gone over carefully, and from the lists are selected such ones that it is bad policy in the judgment of the credit man to allow to remain unread. These are given to the shop foreman, who details a man to get the readings, and the man keeps at it until they are obtained. A file of the city directories is kept, a directory a year or so old frequently proving a man who disputes an old account to be guilty of misrepresentation in denying some previous place of residence. An over zealous man, by clinging too closely to his written record and not allowing his judgment fair play, would be apt, in a company where shut-off notices are frequently sent, to be a brake on the wheel of the new business department. While a carefulness in passing upon an order is to be expected, it is understood that the records of the Company must show sufficient reasons for requiring a deposit or other security. If the records show a man to be in debt the credit man should contrast the debt with the man's character and misfortunes. Some people of integrity, industry and good habits appear on our credit record, owing to a series of events which they could not control.

We welcome these people when they again apply for a meter, and adopt a series of easy payments on the old account. When a man, whose credit was poor, pays his old bill, and again becomes a customer it is a mistake to be thrown off one's guard merely because he meets his bills with promptness.

A memorandum should be entered against his name in the ledger and his account continuously watched, so that history may not repeat itself. In closing, I will say that a credit record, to be of value, must always be kept up to date, and, in order to keep the loss on accounts receivable down to a fair average, no system can equal the results obtained by a diligent industrious collector, while an indifferent one will lose for his company many dollars.

[To be continued.]

Address of the President (Mr. F. W. Bowen, of Kenosha, Wis.) of the Wisconsin Gas Association, on the Occasion of Its Second Annual Meeting, Feb. 11th and 12th, 1903.

Gentlemen of the Wisconsin Gas Association: It is but two short years since the formation of this Association, and we are now at the third milestone in our history.

We are gathered this day at the second annual meeting of our Association, each with another year's experience of success or failure along the particular lines which we had resolved a year ago to follow. If success has followed our efforts we may well be proud of it; if failure in any particular, let us reflect that such may be but seemingly so, and the experience we have gained will possibly turn our failures into future success.

I shall not attempt to inflict upon you any review of the business generally, for it does not seem to be within the scope of an address of this kind, but without question the year has been an active one in our business. The policy of all the managers has been a broader and more liberal one, and I think it is safe to say that the public has been better served than ever before.

During the year just passed no new or startling methods of manufacture have been brought to our notice, and most of us are making gas in the same old way, though possibly using more improved methods of distribution and sale.

Possibly the things that have caused us more trouble and anxiety than any others have been the high prevailing fuel prices and the difficulties in supply, on account of the shortage in railroad facilities; and to those of us who manufacture water gas this feature has been a barrier to lower cost of production.

We are confronted with an enhanced cost of manufacture, and were it not for the fact that our sales generally are increasing, we should find also that the distribution costs per 1,000 sold were much higher than in past years.

Increasing fuel prices, however, may not be an unmitigated evil, for without doubt many of our coal gas works have established better home markets for their coke product, and will find in the future that much better prices will prevail. Thus the balance will again be struck, and the increased profit from this portion of the business more than offset the higher cost of gas in the holder.

I think I may safely say that ours, the youngest, of the State Associations, has done much good for all of us, and we can congratulate ourselves that our 2 years of growth has shown a larger membership proportioned to the number of companies doing business in the State, than I think has been shown by any of our Associations at the same age. Our membership comprises representatives from practically all of the Companies of the State, and the few who are not with us now are likely to be in the future, as the advantages of such an organization are better known and understood.

Our membership comprises many who are operating combination plants, and I may observe that the percentage of such seems to be larger in Wisconsin than in the most of the States, the tendency, however, being towards such combinations; and the fact that we have so many members of this class is, without doubt, a distinct aid to the member who may operate an exclusive gas plant, in that he may in many cases find help, in the competition in which he may be engaged, through many useful hints and a knowledge gained by association with those who operate both classes of business.

Generally speaking the sale of gas for illuminating purposes has greatly increased within the past year, which result has been accomplished through several agencies, one of the most potent being the more liberal treatment of the public by the progressive managers in the inducements held out to consumers by extension of main systems, and in many cases house services, without cost to the consumer; also, by various plans through which the would-be consumer is enabled to have his premises piped and supplied with the necessary fixtures to enable him to burn our product. All such plans are not only a distinct advantage to the consumer, but a corresponding gain to the company which is progressive enough to formulate them and carry them forward to a successful completion.

In this manner many of the gas fraternity have succeeded in competition with their electrical opponents; and as the movement grows it will gain in force, and the effort to obtain new consumers will be less and less severe, until after a few years of continuous and persistent effort it will be an easy matter to add a goodly percentage of illuminating consumers to your ledger pages. It is by meeting in such Associations as ours that the opportunity occurs to become acquainted with the differing methods of obtaining this class of business; and newer and fresher ideas obtained by all.

Sales of gas for fuel purposes have also increased, and generally to a greater percentage for the reason that, for the past several years, and particularly since the extensive introduction of the electric light, the gas fraternity has looked towards the fuel field as the particular outlet for any extension or growth of the business; and, therefore, more attention has been paid to this growth of the business, and it has been cultivated more particularly by the introduction of the gas range in the first place, and by other fuel and industrial devices more recently. There is still much to be done along these lines, and it is probable that with many of us the beginning has been reached.

One thing is very certain, that for fuel or heating purposes, gas has a long lead, and one which would be very difficult for our electrical friends to overtake until such time as the electric current can be generated for much less than now and can be stored in such manner as to be available at any future time.

When that time shall have come, we will still continue in business, for, "our friend the enemy," if there still is any of him left which we have not already taken in camp, will yet be confronted with his distribution cost, which, so long as copper retains its present relative value to iron, or anything near it, will be so high that competition with us in this department of our business will still be impossible. Therefore, the general proposition to him will be, that he must guarantee at less than one-half the present cost of generation by water power; and he must find some other metal than copper, or the ratio of that metal as compared with iron must decline one-half or more.

I would not abandon this line of thought without emphasizing the idea that we must not only more fully develop the fuel department of our business, but must also again, with courage and firmness, advance the illuminating feature of it, and as vigorously push that department as for the past few years we have the fuel end. It can be done, and a very considerable part of our illuminating business recovered, the aides being, as before indicated, attractive plans for reaching the public and

the further development of incandescent lighting; as, for example, the gas arc for business and public lighting and more extended and effectual introduction of Welsbach or similar lighting in residences.

We are aided very materially in the accomplishment of our object by the better manufacture of mantles at the present date, and many of the former objections raised by consumers are done away with by the progressive work of some of our friends in the mantle business, by which we are enabled to furnish the public at lessened cost with a vastly better article.

Our business has still a bright future before it, and he would be a pessimist indeed who would advance the idea that we are going backward. I think the list of papers to be presented to this convention, with the names of those presenting them, is an index that the Wisconsin Gas Association is in no sense losing ground, but rather the contrary. It is scarcely necessary for me to speak of these papers for they will speak for themselves; they, however, cover a considerable range of subjects and each of interest.

"Ammonia Concentration for Gas Works" will be presented to you by Mr. John S. Unger, of Milwaukee; and I think I am safe in saying we have no one among us better qualified to treat this subject, which will assume more importance in the future than in the past.

"Central Station Gas Engines" comes from one of our members. Mr. C. H. Williams, of Madison, who has probably more experience with this class of power than any other in our immediate circle, and who is in the line of experience with this comparatively new power for electric generation.

"A Second Year's Experience in Distributing Artificial Gas Under High Pressure," by Mr. Geo. F. Goodnow, of Waukegan, will treat of a subject that, without question, will in the future interest all of us, much in the same manner as the alternating current generator was, in its earlier development, of interest to the electrical manager and for the same reason.

"Gas for Industrial Purposes," by Mr. James H. Walker, of Milwaukee, will set forth one of the most interesting features of our future development, and is by a gentleman of probably larger experience in this particular phase of the business than any other amongst us.

And last, "A Few Photometric Tests of Incandescent Mantles in Commercial Use," by Mr. R. C. Cornish, of Racine, will, I think, prove that the work of some of our mantle manufacturing friends has been progressive and will certainly touch upon a question of great interest to us all.

Another matter to which I would call the attention of this convention, which is a subject of thought and action by other Associations of similar character, is the standardization of advertising matter. This has recently been before the Northwestern Electrical Association, which took action upon it at its meeting held in this city last month, and adopted the report of its committee appointed over a year ago. I am of the opinion that similar action might well be taken by this convention.

I would say in conclusion, gentlemen, that your officers—and I must especially mention the efficient Secretary of this Association—have endeavored to make this a successful meeting, and it rests largely with you as to the measure of that success, as the fullest discussion of the papers to be read will tend to make the meeting the more profitable to all, and success depends largely upon the profit derived.

Gentlemen, I welcome you.

A Second Year's Experience Distributing Artificial Gas Under High Pressure.

[A paper read by Mr. Geo. F. Goodnow, of Waukegan, Ills., at the Second Annual Meeting, Wisconsin Gas Association.]

The writer very much appreciates the compliment to his subject of last year, manifested by a motion "That he give us to next year, if he is on earth, a continuation of this paper, and give us his experience during the year." That these notes, relating the experiences, favorable and unfavorable, which have come under his observation and experience during the past year, can be dignified by the name of the paper, he is very much in doubt; but that they have interested and instructed him, he has no doubt, and he hopes that they may interest you for a short time.

The most troublesome feature encountered during the year, and it may be said the only troublesome feature, was electrolysis of the main line and service pipes in certain districts in the vicinity of two power stations of an electric railroad. Pipe which had been in the ground less than 2 years was perforated by this action and permitted the escape of gas, though not in very large quantities. At one place the main was uncovered for 300 feet, and it was decided best, after inspection, to cut out this section and replace it with new pipe, which was done. Acting under the advice of Mr. J. M. Humiston, of Chicago, this section was boxed and the boxing filled with tar concrete. After making an electrical survey of the whole line, Mr. Humiston also advised placing insulated joints, consisting of a piece of enameled pipe 10 feet long, inserted in the main and connected with Dresser couplings. He also advised placing a number of these insulators at intervals along the line, these intervals being according to the strength of the current manifested in the electrical survey in the districts of danger. Quite a number of these insulators were put in without interruption to the service by closing two valves at either end of a section of main. This operation could be done in two hours or less, and the elasticity of the gas in the district cut off from the compressing station would easily supply the gas needed during that time. This operation was repeated a number of times, and quite a number of insulators were thus inserted, but it is expected more will be put in next year to more completely protect this line. The efficiency of this mode of protection is demonstrated by another survey after the insulating joints had been put in, and when it is said that before this treatment the amount of current passing from the pipe to the ground was, at a given point, 14 volts positive to track, and 27 amperes drained from pipe into track, after this treatment the amount of current carried on the pipe was, at this point, 2 volts positive to track, and 2 amperes drained from track to pipe, some idea of the efficiency of this treatment can be secured.

Measurements made before and after pipe insulation gave the following results:

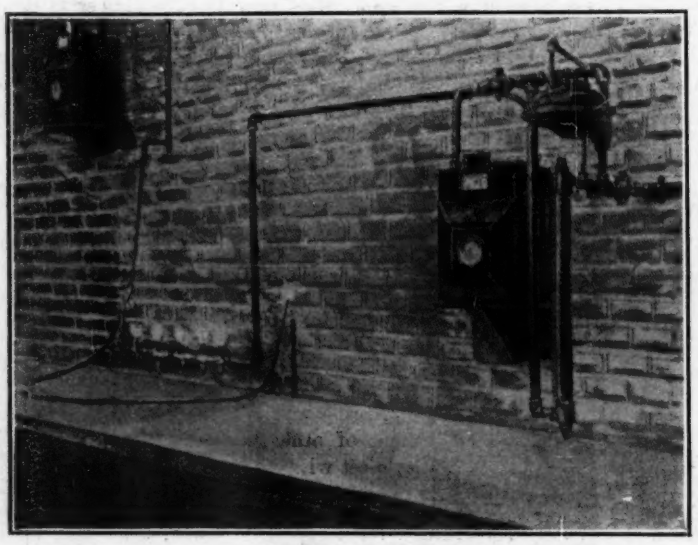
Before Insulation.		After Insulation.	
Volts.	Amperes.	Volts.	Amperes.
14	..	.2	....
18	46	Neutral Condition.	
6	30	2.5	13.0
6	24	2.0	14.0
9	32	1.2	.9
—7	—40	—4.0	—25.0

Tnis method of protection has been confirmed by other electrical engineers in which the writer has great confidence. This method could also be applied to any system of underground piping in the vicinity of electric lines for the use of gas at high or low pressure, or for other purposes. If this fact had been so well known at the time this line was constructed, these measures of protection might have been introduced at that time at much less expense than when they were put in, and much damage and annoyance would have been saved. The writer is confident that protection can be secured in this way that will prevent serious action by electrolysis if due attention is paid to this danger when the line is being put in, and the expense of so doing is not great.

Bonding the pipe to the rails for establishing a return current cannot be recommended, because the action would be distributed over the whole pipe system, and while corrosion would not perhaps be so rapid in that case, the trouble would only be deferred and probably be more widespread.

Trouble with condensed water feezing in the main was mentioned last year, but this trouble has not been experienced so far this winter, and the means taken to prevent this are very simple and apparently have been efficient. To repeat the conditions under which this trouble occurred, about 1,000 feet from the compressors the 4-inch main passes over a stone culvert, with less than 2 feet of cover, consequently this main lies in frozen ground for some distance, and last winter at this point stoppage occurred by freezing. Immediately after the compressors a pulsation tank collects a considerable portion of the condensed water. A drip was devised and placed about 400 feet from the compressors in the line. This drip was of the shape of a small, horizontal boiler, 30 inches in diameter and 8 feet long, with a pipe entering and leaving each head near the circumference on the upper side, thus giving the condensed water a chance to drop about 24 inches to the bottom of the tank, and baffle plates were inserted in this tank at right angles to the flow of the gas, causing the current of gas to zigzag around the baffle plates and water be deposited in the bottom of the tank. This brings the bottom of the tank about 6 feet below the top of ground, which effectually prevents freezing. A blow-off was placed in the bottom and was brought to the surface, where a turn of a buried stopcock allows the condensed water to blow through in a few moments. As only a small amount of water has been found beyond this drip, it appears that the action is efficient and that no stoppage from frost has occurred beyond this point is certain.

These are difficulties which we consider have been successfully overcome, and it can hardly be said that other difficulties have been encountered. All the troubles which were naturally prophesied by our



Individual Regulator.

selves and others, such as decreased candle power, intermittent service, large leakage, unreliable regulators, defective compressors, blowing seals, burst meters, deficient capacity of the small pipes, have not been encountered, and the troubles incident to operation compared with ordinary low pressure distribution, are much less.

The writer last year advanced the tentative opinion that a complete high pressure system, with individual regulators before each meter or group of meters, was preferable to large district regulators controlling a considerable territory of low pressure main with ordinary services and other fittings, and this opinion has been amply confirmed by the past year's operations.

Very little low pressure main has been laid. Extensions have been laid almost entirely from the high pressure pipes; even some territory in Waukegan adjoining the older low pressure districts has been piped with small high pressure mains, the construction and operation of these being entirely satisfactory.

There are about 175 lamp posts located on this line, and the pressure at the burners is controlled in three different ways. Part of them are located on low pressure main which is controlled by district regulators, which, of course, makes connection and operation very much like an ordinary street lamp with mantle burner, with this important exception, that none of these services have ever been frozen, which satisfactory state of affairs is accounted for by the drying of the gas by compression and the elimination of the water by the methods mentioned heretofore.

About 25 or 30 more of these street lamps are controlled by small individual regulators, placed either at the bottom or at the top of the posts. These small regulators are very similar to the house regulators, only much smaller, with ⅜-inch inlet and outlet, and the controlling diaphragm only about 3 inches in diameter. This method of regulation is more liable to get out of order because of the exposure of the regulators to the weather, and a very minute amount of water condensation in the regulating valve occasionally, though not very often, freezes, and the diaphragm may also become ruptured or injured from exposure.

The third method is being used upon about 60 posts maintained in Lake Forest by the Welsbach Street Lighting Company. We had made some experiments and devised a cock with a small orifice, to be used directly under the mantle burner without a governor. That Company, making use of the experiments we had made, manufactured a cock in connection with a street lighting mantle burner, which has been in successful operation for over 60 days, using 3 feet of gas per hour at 20 pounds pressure, and these street lamps certainly give a brilliant light. A variation of 5 pounds does not noticeably affect the light, and the community in which these are used is well pleased with this illumination of its streets.

After 6 or 7 cold nights, in which these lamps had not been used on account of moonlight, 6 of the 60 were found frozen in this capillary orifice, but were thawed out with little trouble. A few cases of frozen services, not exceeding a dozen in 2 years, have occurred on the entire pipe line, which now feeds from 700 to 800 meters.

These facts, and the observations regarding condensed moisture, lead to the belief that it is not necessary to lay pipe very deeply in the ground, except for protection from mechanical injury. A few cases have occurred of broken service pipes injured by plows or graders in lowering the level of streets and gutters, but no great difficulty was experienced in repairing these breaks.

Roughly speaking a 1¼-inch pipe will carry as much gas under these conditions as a 4-inch pipe under low pressure and a 2-inch as much as a 6-inch. All these conditions make it evident that the cost of construction for equal service is very much less; how much less could only be calculated from local conditions. Whether it would be advisable to use high pressure mains in large cities where the population is dense has never been demonstrated in the distribution of artificial gas, but very considerable towns and cities have had natural gas for years contained in pipes under the streets at higher pressure than these. That it can be used in towns and cities of moderate size admits of small doubt in the mind of the writer, and no doubt, when applied to the service of suburban localities and sparsely populated districts, of which every town and city has its share, indeed it is the only method to profitably supply such districts with gas from a central plant. This pipe line has satisfactorily demonstrated during the past 3 months that it can easily supply 100,000 cubic feet per day and 10,000 feet as the maximum hourly output. This amount was very easily transported, and that it would handle 50 per cent. more than this under a maximum pressure of 30 pounds admits of no doubt. That 600,000 feet have been sent through a 6-inch line 3 miles long at another plant without coming anywhere near its capacity is known by the writer. These few examples of the capacity of these high pressure lines in the sizes mentioned enable one to form some idea of the amount of gas that can be handled under such conditions, to say nothing of raising this pressure 10 or 20 pounds more, which the writer believes can be done without injury in any particular.

The average capacity of each stroke of each compressor has been carefully measured by pumping a considerable amount of gas from the small holder, and the number of strokes recorded each day by an automatic counter, kept in a similar way, to a station meter record, give us a fairly accurate idea of the leakage of this entire pipe line. This amount is arrived at by subtracting the sum of the consumers' meters from the amount registered by the counter in the familiar way, like a station meter, and the amount lost during the last few months has averaged about 3 per cent.

The amount sold upon this line during the last few months has been about 2½ millions per month. The average meter consumption in one district, which now contains nearly 400 meters, has been 35,000 cubic feet per meter for the year. The number of miles of pipe of different sizes, comprising 4, 2 and 1¼-inch now in use, is about 28 miles.

The pressure after the individual regulators, as well as that after the district regulators, varies so little during the 24 hours that the operation of stoves, Welsbach lights, etc., is very satisfactory, and is rarely subject to complaints, unlike those received in a low pressure system, caused by considerable reduction at hours of greatest consumption and excessive pressure at times when the consumption is little. During the year complaints caused from faulty regulators have been very few, and I believe only 2 or 3 have had to be exchanged in order to be readjusted.

The variation in candle power between the two systems of distribution of the same gas has been very slight, and it is the opinion of the writer that increased efficiency in illuminating value and heating value, caused by the drying of the gas during the process of compression, fully offsets any decrease in these qualities from the deposit of illuminants by compression.

Finally, the operations of the system have been satisfactory; the amount of sales for two seasons in a scattered, thinly populated territory has been more than we had any reason to expect; the troubles incident to distribution have been less per meter than upon the low pressure system; the supply for the last 12 months has not been interrupted for an hour for any reason, and the chief difficulties, mentioned in the first part of the paper, we think have been successfully overcome. If the system were to be constructed over again, no district regulators would be put in, and consequently no low pressure pipe; protection against electrolysis would be freely introduced of the kind we are now using.

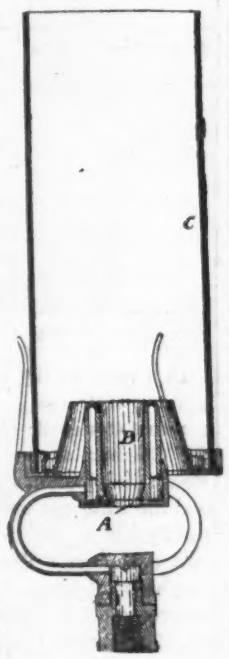
When the time comes to increase the capacity of the line, either to supply present territory or add more territory, a duplicate line will be put in parallel to the present one for about half of the distance, and this second line would not only increase the total capacity but furnish an assurance of supply should either line for any reason be injured, as the two can be connected by valves in such a way as to be used separately or together.

The operation of the compressors, which are in duplicate, has been satisfactory, and the repairs trivial, and at no time have both of them

been out of order. The two have been run together for short periods at the hours of greatest consumption, which shows that the capacity of transmission can be almost instantly increased and the failure of supply at this point, from anything short of a general wreck, improbable.

An Improved Test Burner.

The *Journal of Gas Lighting*, in noting an application by Mr. Walter Grafton, to the British Patent Office for a patent on "An Improved Argand Burner for Gas Testing," says that the patentee begins his specification by pointing out that the illumination of a gas flame is dependent upon the quantity of air supplied to the burner, and means must be provided to properly distribute the air to the gas "to effect a thoroughly brilliant and maximum incandescent flame." As in Sugg's "London" Argand, the improved burner consists of an annular hollow steatite ring *B* (pierced with holes on its upper surface for the egress of the gas) connected with a metal body having 3 supply tubes terminating in a ⅜-inch socket. A gallery resting upon the supply tubes serves to carry a glass chimney and a metallic cone. The gas issuing from the many orifices at once coal esces, and produces a hollow cylindrical flame. A chimney *C* (of suitable dimensions) se rves to induct the necessary quantity of air; this being governed to some extent by the inter nal diameter of the annular steatite chamber *B* and the metallic cone, which direct the air to the flame. The dimensions of the burner are:



Diameter of the supply pipes	0.08 inch.
External diameter of the annular steatite chamber	0.84 "
Internal diameter of the annular steatite chamber at the upper end *B*	0.48 "

The internal diameter of this annular steatite chamber is reduced at the lower end *A* either by inserting a metal reducing piece—tapered internally upwards for fully three-fourths of its length—of ¼-inch long, or by gradually reducing, from a point commencing at ¼-inch off the bottom including the seating of metal body, the internal diameter of the air passageway in the steatite chamber at its lower end *A* to about 0.37 inch. When $\frac{3}{64}$ inch from the actual bottom, the internal diameter at *A* is of uniform size—*i. e.*, of practically 0.37 inch. The number of holes in the steatite ring is 24.

Diameter of each hole	0.045 inches.
Internal diameter of cone, at the top	1.080 "
" " " " bottom	1.500 "
Height of upper surface of cone and of steatite chamber above the floor of the gallery	0.750 "
Height of glass chimney, according to the kind and quality of gas to be tested—namely, for coal gas of 16.75 candles and under, when consumed at such a rate as shall give a light equal to 16 candles	6.000 "
For coal gas of such quality when burnt at such a rate as shall give a light equal to 14 candles	5.000 "

When used for mixtures of coal and carburetted water gas—when consumed at such a rate as shall give a light equal to 16 candles—having the following so-called qualities:

Mixtures of above 17 candles	6.0 inches.
Mixtures of from 17 to 16 candles	5.5 "
Mixtures under 16 candles	5.0 "
But for mixtures of 14 candles and under, when tested to give a light equal to 14 candles	4.5 "
For carburetted water gas of so-called 14 candles, when consumed at such a rate as shall give a light equal to 14 candles	4.0 "
Internal diameter of chimney in all cases	1¾ "

The invention is said to be particularly applicable for testing all illuminating gas of 17 candles and under this quality, as at present determined by Sugg's "London" Argand No. 1, on the 16 or 14-candle or other flame basis. The patentee finds that with ordinary gas he obtains "greatly increased candle power with a diminished consumption of gas by the better regulation of the air entering the burner, necessary for the combustion of the gas—thus securing the highest illuminosity."

As an example of how to apply the invention, he suggests reducing the internal or central air passage *B* of the No. 1 "London" Argand (say) by a small annular reducing piece having an inlet internal diameter of 0.36-inch to 0.39-inch, but preferably 0.37-inch, and using (say) for 14-candle gas a 5-inch by 2-inch external diameter chimney. This produces from 5 to 10 per cent. or more rise in the illuminating value of the gas, which is the maximum, as compared with the result now obtained with Sugg's "London" Argand No. 1.

A Cheap, Effective and Safe Method of Mine Illumination.[1]

By Mr. Jno. W. Maxwell.

The proverb, "Necessity is the mother of invention," is so trite that its quotation calls for an apology, but its truth has been demonstrated in so valuable a way in the prosecution of an important and dangerous work here that, for the benefit of other workers in like profession—mining engineers—who may meet with similar difficulties and dangers, I give you the result of an experiment in the use of sunlight as a means of illuminating underground workings.

An important part of my work during two years was the construction of a deep adit level, to serve also as a base of development of the vein and a main channel of out-carry for ores extracted on higher levels on the mine, and it was attended with serious difficulty and danger in consequence of the existence of inflammable gases in the rock through which it passes. Three serious explosions of this gas occurred during six months, due to its ignition by workmen using open lights, and eleven persons were very badly burned. Workmen at last reached such a condition of fear of consequences that they could not be induced to take such chances of death, to earn a living, as work in the tunnel offered. Safety lamps would not furnish sufficient light. The question, then, was what safe means of illumination could be used. This question was decided, in a measure, in a peculiar way, and was the direct result of necessity, which compelled me to go into the heading of the tunnel to look after the men that had just been burned by an explosion. I had recourse to a common looking-glass for a reflector of the sunlight. The result was marvellous. The whole tunnel was a flood of bright daylight—sides, roof and floor, throughout its entire length of 2,500 feet, and all furnished by such a glass as can be bought in your city shops for a dime. Confidence was at once restored in my workmen, and when we could command the sun, we could command more labor than the work would employ.

The conditions of the tunnel and the philosophy of the light were these: The tunnel was straight, 6½x5½ feet inside of timbers; its course south 36 degrees 15 min. west from the mouth; and was ventilated by a current of air forced in by a Burleigh compressor operated on the outside. The philosophy of the light—its intensity and perfect diffusion—is thus accounted for. The air driven into the tunnel was saturated with moisture in the process of compression, and upon being released in the heading, resolved itself into its natural volume, when the excess of water was liberated in the condition of a mist or fog, very light, of course, and millions of these atoms of water became direct reflectors at as many million angles. To convey an approximate idea of the intensity and brilliancy of the light it will perhaps be sufficient for me to say that the smallest type used in your publication was as clear at a point 3,000 feet from the looking-glass as in the open sunlight, and every item in your paper can be read at any point in the tunnel as rapidly and with as much ease as if out of doors.

It may be that some unfortunate may derive a benefit from having the use of this light suggested to him. If it will save one individual from being burned, as I have been, or as I have seen a number of my workmen, I shall be fully compensated for having spent the time in preparing this communication, and you will be entitled to the thanks of the mining profession everywhere for publication.

The light may be used for many purposes underground, and many times diverted from the first mirror line. Dr. George F. Becker, who examined the mine, said of it that "After the explosion Mr. Maxwell employed a very ingenious method of lighting the tunnel without the use of fire. A mirror was placed at the mouth of the tunnel and was kept at such an angle as to reflect the sun's rays into it. This illumination, which was repeated for my benefit, was very satisfactory. The cloudless sky of California makes this entirely practicable. A locomotive headlight might perhaps be used to advantage in a similar manner underground in certain cases. Possibly this device has been employed before, although I am not aware of it."

1. *Pacific Coast Miner.*

Effect of Pressure of Gas on Luminosity.[1]

Results of MR. HOLGATE'S Experiments.

It may be remembered that in the course of his Inaugural Address to the Institution of Gas Engineers, at their meeting in May last year, the President (Mr. Thomas Holgate, M. Inst. C.E., of Halifax) gave, in an appendix, the results of a number of tests made by him with high and low grade gas. Reference was also made to other tests, which he had tabulated in a second appendix. As this bad not been completed at the time of the meeting, Mr. Holgate kindly promised that it should be prepared for subsequent publication in our columns. We have now received it, and give it below.

APPENDIX B.—*Effect of Pressure of Gas on Luminosity.*—Tests of No. 4 Kern Burner with Welsbach Mantle.

Date of Test.	Pressure of Gas. At Inlet of Governor.	Pressure of Gas. At Inlet of Governor.	Cubic Feet of Gas Per Hour.	Illuminating Power. In Candles.	Illuminating Power. Per C. Ft. Per Hour.
Jan. 22, 1902....	0.90	Without Governor.	3.77	70.4	18.70
	1.45		4.69	86.8	18.50
	1.50		5.17	94.5	18.30
	2.10		6.32	104.9	16.60
Average of 4 tests.	1.49	.....	4.99	89.15	18.02
	1.05	With Peebles Needle Governor.	3.08	59.4	19.30
	1.65		4.41	104.9	23.80
	1.95		4.51	112.4	24.92
	2.56		5.22	118.4	22.71
	2.90		5.00	112.4	22.48
Average of 5 tests.	2.022	.....	4.444	101.5	22.64
	0.99	With Peebles Disk Governor.	2.705	59.5	21.90
	1.18		2.910	68.4	23.50
	1.44		3.410	113.2	33.30
	1.44		3.450	113.2	32.90
	1.60		3.745	106.5	28.50
	2.01		3.710	105.7	28.50
	2.45		4.320	123.8	28.70
	2.95		4.290	123.8	28.90
	3.53		4.350	121.1	27.90
Average of 9 tests.	1.955	.....	3.654	103.9	28.23
Jan. 29. 1902....	2.05	1.05	4.17	110.0	26.40
	2.52	1.01	4.00	119.3	29.84
	2.92	1.00	4.11	121.0	29.54
	3.58	0.98	4.08	125.6	30.70
	4.00	0.94	4.11	125.6	30.60
Average of 5 tests.	3.014	0.996	4.094	120.3	29.42
Feb. 7, 1902.....	0.58	0.465	2.700	84.0	31.1
	0.65	0.530	2.830	99.0	35.0
	0.75	0.650	3.000	111.0	37.0
	0.80	0.660	3.160	113.2	35.9
	0.82	0.665	3.175	115.8	36.5
	0.85	0.690	3.170	115.8	36.6
	0.85	0.695	3.300	115.8	35.1
	0.88	0.695	3.073	115.8	37.4
	1.10	0.890	3.700	117.5	31.8
Average of 9 tests.	0.809	0.660	3.1253	109.76	35.155
Feb. 8, 1902.....	1.11	0.56	2.91	110.0	37.8
	1.13	0.56	2.97	112.0	37.7
	1.15	0.59	2.98	112.5	37.8
	1.15	0.60	2.95	111.0	37.7
	1.17	0.57	2.97	112.5	37.9
	1.21	0.60	3.04	115.0	37.8
	1.21	0.61	3.03	118.0	39.0
	1.25	0.64	3.19	130.0	40.7
	1.29	0.65	3.16	130.0	41 2
	1.32	0.67	3.24	130.0	40.1
	1.34	0.68	3.17	130.0	41.0
	1.40	0.71	3.33	130.0	39.1
	1.64	0.74	4.22	130.0	30.4
Average of 13 tests.	1.259	0.629	3.166	120.85	38.323

1. *Journal of Gas Lighting.*

Date of Test.	Pressure of Gas. At Inlet of Governor.	Pressure of Gas. At Inlet of Governor.	Cubic Feet of Gas Per Hour.	Illuminating Power. In Candles.	Illuminating Power. Per C. Ft. Per Hour.
March 17, 1902..	1.5	0.60	2.83	142	50.2
	1.8	0.60	2.75	154	56.0
	2.1	0.60	2.83	137	48.6
	2.8	0 60	2.78	137	49.3
	3.7	0.60	2.74	165	60.3
Average of 5 tests.	2.38	0.60	2.786	147	52.88
April 2, 1902....	4.0	0.54	2.75	151	54.9
	3.5	0.54	2.75	151	54.9
	3.0	0.54	2.77	151	54.5
	2.5	0.54	2.75	151	54.9
	2.0	0.54	2.43	169	69.7
	1.5	0.54	2.43	169	69.7
	1.0	0.50	2.43	169	69.7
	0.9	0.50	2.30	134	58.1
	0.7	0.40	2.12	99	49.1
Average of 9 tests.	2.12	0.515	2.515	149.3	59.5

In a note to the tables, Mr. Holgate says: "These tests were made upon a Referees' table photometer, fitted with Harcourt's 10-candle pentane standard; and the readings were observed by Mr. J. F. Smith, the Chemist at the Halifax Gas Works, assisted by Messrs. W. N. Booth and Joshua Pyrah. The difficulty of comparing upon the photoped the different colored lights was recognized; and, in order to check the figures given in this appendix, further tests have been made with two observers. These latter results confirm the former. The writer has been in communication with the maker of an instrument designed to overcome the disparity of color in lights, but up to the present [Jan. 28, 1903] has not been able to procure the same. He hopes to be able to repeat the tests, using a bar photometer fitted with a star disk. The gas used in the tests was of 18-candle power, made from coal and cannel."

A Unique Electric Plant.

By MR. L. B. CHERRY, in *Elec. World.*

An electric plant operated by hot water is the latest development in the Far West, and forms the subject of this article. Thermopolis, Wyoming, is the scene of this novel achievement, and it may be of interest to give a brief history of the town and the Big Horn Basin Hot Springs, which are so potent in healing and at the same time are the source of power for an electric lighting plant.

In 1897 the Government purchased a tract of land 10 miles square from the Indians, and donated one mile square and the hot springs to the State, the remainder of the tract being thrown open to settlement. Just across the Big Horn river from the springs the town of Thermopolis was laid out, and soon contained a number of fine cut-stone business houses and hotels. The State has built a $10,000 steel bridge across the river, and laid out a park ½-mile square, which will be set with trees and shrubbery next summer. The State has also built a free bath house of cut sandstone, and this, with a plunge bath house and sanitarium, makes Thermopolis a health resort second to none in the Far West.

There are several large hot springs along the river, and from the river bed hot springs bubble to an extent that for miles the river never freezes over, thus making it an ideal stream for water power. The waste water from the largest of these springs is used by the Thermopolis Electric Light and Power Company for power. Fig. 1 shows the spring, which is a hot, seething pool 20 feet in diameter and so deep that it has never been fathomed. Sulphurous gas and steam are released at the surface, the effect of which gases is to impart a bluish tinge to the water. The temperature of the water is 138° F. The volume of water is 750 cubic feet per minute, with a head of 48 feet available for power. Fig. 2 shows part of the water as it falls over a beautiful snow-white formation into the river 48 feet below.

In the construction of the power house, a room 16 feet by 24 feet was excavated from the solid rock formation next to the river, just to the left of the view represented in Fig. 2, and to gain access to it one must go down a stairway to the river and land on a natural porch overhung with stalactytes tinged with many colors.

Fig. 3 gives an idea of the exterior of the plant. The equipment at present consists of a 30-kw., 1,100-volt Westinghouse alternator, belted to a 13-inch "American" turbine of the horizontal type. Owing to the steam and gas which the hot water gives off when being agitated, the turbine had to be placed as near tail-water as possible to get the full

Fig. 1.—View of Spring.

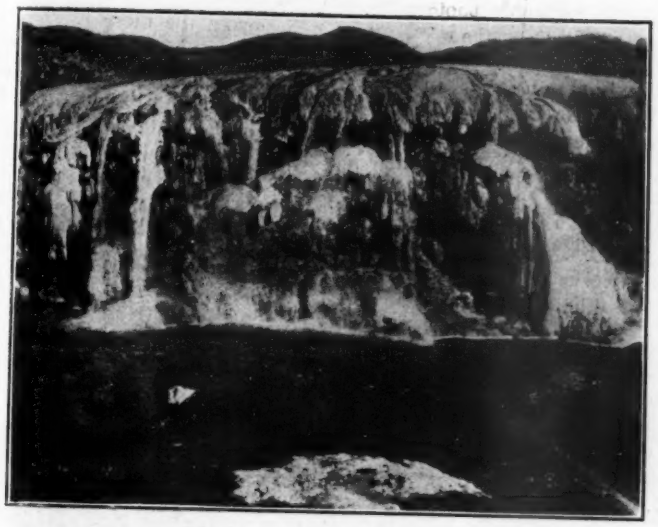


Fig. 2.—View of Portion of Falls.

Fig. 3.—View of Exterior of Plant.

value of the power, as otherwise the steam and gas would have partly filled the draft tube.

A small street car line will be put in next summer to carry passengers to the springs, which are one mile from town. When the present plant becomes too small, a power will be developed in the river, where 1,000-horse power can easily be obtained. The company will then have power to sell for irrigation, and for the operation of coal mines, which are only a few miles out of town.

Gold and nickel were recently discovered while boring a well, and should these metals prove to exist in paying quantities electric power for the mines will probably be furnished.

Notes on Central Station Working.

By a "Station Engineer," in *Elec. Review.*

When the reasons for the existing low charges for electrical energy, as compared with those in vogue ten years ago, are considered broadly, the variety of experience gained in that comparatively short space of time points to the fact that improvements in design and economies in working the plant have run hand in hand to bring about the reductions; so much so is it the case in districts where load factors run high that it is hard at first sight to foresee how the proportion of total working cost to revenue can be improved upon to any marked degree. It has occurred to the writer, who has had an intimate insight into central station practice and departments connected therewith for a number of years, that the guiding spirits of such enterprise, be they boards of directors, municipal committees, or other advisory bodies, are not sufficiently alive to the importance of urging the staff directly responsible for carrying out the duties of the business to do their level utmost individually to secure progress for the concern. The idea is by no means a new one, but it is undoubtedly the right method of appealing to the willing efforts of every human being engaged in the higher services of a corporate body.

The usual method of fixing a salary which bears progressive increments according to length of service or, as is too often the case, to no rule at all, simplifies the ledger entries in a most delightful manner, but it does not take into account whether there has been adequate return for such remuneration—so long as hard and fast rules are adhered to, the service is considered satisfactory.

The chief engineer of a central station of any magnitude can have only a superficial knowledge of the inner workings of each department under his control, and must rely to a very large extent upon the brains and energies of his subordinates for the best results; if these results do not come up to expectations, it is exceedingly hard for him to account for them individually, and in a comprehensive manner.

Boiler Room.—The economics which may accrue from systematic supervision in a central station are manifold, especially in the boiler room, where a lamentable lack of interest is often displayed; and yet it requires the most skillful generalship to raise steam economically under all loads; the boiler room is less clean than the engine room, and is left more to the tender mercies of a foreman than to an educated engineer. The former can do much in the manner of handling the working staff, which, in this department, is not always an easy matter, but it requires an educated head to reduce to a minimum the several losses which are always bound to be incurred in plants of this description unless remedied in time. Boilers being the least efficient part of the generating plant, therefore require by far the most attention.

Engine Room.—A great deal of time and thought is bestowed upon the engine room and its adjuncts, because it is here that the attractive mysteries of electricity have full play for the staff in general; so long as the engines run round without knocking, the dynamos give their specified output, and the pounds of coal per unit are normal, all is well—the engines may be indicated at intervals, the switchboard instruments and energy meters checked occasionally, and in general, so long as the yearly results show a progressive improvement the whole is pronounced to be satisfactory.

Mains.—The mains department has usually the brunt of the fight to bear in dealing with discrepancies which appear fitfully, requiring frequent and often immediate attention, while weak points are ever on the increase as the system grows.

Now, in giving a brief *resume* of the routine of many a central station, one cannot make any hard and fast suggestion as to how the results, be they ever so good, can be materially improved by one or more responsible engineers, since local conditions and systems vary in almost every case; but it is strongly contended that every responsible member of the staff would take a much greater interest in his work, and put forward his highest efforts in the interest of his employers, if something more than a salary, varying more perhaps by luck than by just merit, were held out; the salary principle does not always do justice to the right person, and offers but little inducement to anyone to be keenly alive at all times to the advancement of interests other than his own.

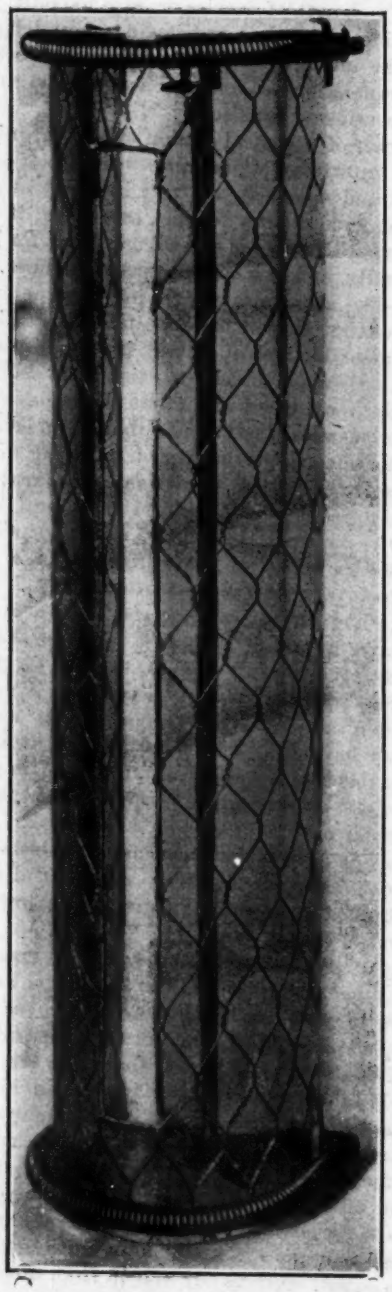
It may be urged that the system of bonuses necessitates a great deal of thought at the outset, requires adjustment from time to time as conditions alter, and is unwieldly for ledger accounts, while the chances of personal friction amongst the various recipients are not remote.

The answer to these side issues is that such forms of extra remuneration have been shown to pay handsomely in towns where prospects were none too rosy for an early return on capital expected; manufac-

turers and salesmen of all kinds profit by such measures to such an extent that it would be doubly hard to meet competition by any other method, and there is no valid reason why electricity undertakings should not follow in the wake, provided that proper provisions are made for the measurement of coal, oil, water, etc., and electrical energy generated and sold. The incentive offered would do much to advance the interests of both employers and staff, and sharpen the faculties of observation and operation of all concerned with beneficial results.

Wallach's Gauge Glass Protector.

Messrs. Wallach Brothers, of London, England, are putting on the market an improved gauge glass protector, which is finding great favor abroad. The protector consists of a horseshoe shaped piece of stout, wired plate glass. The wire netting, which is embedded in the substance of the glass, prevents any fragments flying in case of breakage, but yet does not in any material way obstruct the view of the fireman. As originally made, the character of the wire netting was uniform all over the gauge glass; but in the modification which is herewith illustrated, a long, narrow "window" is provided as indicated, giving the



attendant a still better view of his water level. The protector is readily attached to existing fittings, being held in place by spiral spring clips. The gauge glass is not shown in position in the illustration; but, as generally arranged, a background, made up with dark circles on a lightground, is fitted at the same time as the protector. The index of refraction of the lower portion of the gauge glass, which is filled with water, is very different from that of the steam filled space above; and as a consequence the dark circles seen through it appear spread out into horizontal bands in the lower half of the tube, but remain nearly round, as seen through the upper half. The line of demarcation between the water and steam in the glass is thus very clearly marked.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE municipal gas works, Richmond, Va., as per the report of Superintendent W. P. Knowles, earned the net sum of $52,052.82 during the twelvemonth ended December 31, 1902. The sum of $40,000 figures in the balance sheet, due to works' depreciation.

CIRCULAR letters were mailed some days ago to the shareholders of the Louisville Electric Light Company and of the Citizens General Electric Company, both of Louisville, Ky., notifying them of the proposition to merge the companies and asking their approval. Our correspondent adds: "This is a formal matter, as two-thirds of the stock of each company, the amount required under the law governing such consolidations, has been represented at all the meetings at which the preliminaries were being arranged for combination. It is not probable, however, that a single stockholder will oppose the merger. The Directors of the companies were notified on the 24th ult. that a meeting would be held on the 19th inst. at which the articles of incorporation of the Louisville Lighting Company (for such is to be the name of the succeeding corporation) will be signed. They will be filed the following day, and business under the new regime will be started in. It is likely that either Mr. A. H. Barret or Mr. J. B. Speed will be chosen President, and that the Vice-President will be Mr. W. F. Sheehan, of New York."

THE works of the Whittier (Cal.) Gas and Fuel Company will be completed by the 25th inst.

PLANS for the remodelling of the gas and electric plants at Eufaula, Ala., have been completed by Superintendent West.

THE Columbus (O.) Gas Light and Heat Company has declared a dividend of 4 per cent. on the common stock. It is payable the 20th inst.

MR. A. B. SLATER, JR., has been appointed Field Engineer to the Western Gas Construction Company, of Fort Wayne, Ind.

THE Committee on Incorporations, Connecticut House of Representatives, has reported favorably on the petition of the New Haven Gas Light Company to increase its capital stock to the sum of $5,000,000.

SENATOR JEWELL has introduced a bill in the Missouri Legislature which provides for the appointment of a gas inspector, whose duties are to be concerned with the quality of gas manufactured and sold in St. Louis, Kansas City and St. Joseph. The inspector is to be appointed by the Governor, subject to confirmation by the Senate. The salary is put at $2,000 per year, and the inspector is to be allowed a sufficient number of "deputy inspectors," at $3 per day each, "to enable him to properly perform the duties of his office." The inspector is also charged with the duties of proving meters on receipt of "due and authentic notice."

EDWARD P. SMITH, General Manager of the Waltham (Mass.) Gas and Electric Light Company, denies that negotiations are underway by which a transfer of the Company's plants to others than the present holders is contemplated.

H. C. ROGERS, of Passadena, Cal., has commenced construction work under the franchise which grants him the right to construct a gas and electric lighting plant at San Pedro, Cal.

MR. J. D. TINSLEY has filed his final report as receiver of the Macon (Ga.) Gas and Water Company.

THE Gas Machinery Company, of Cleveland, O., have been awarded a contract for the reconstruction of the coal gas plant of the Alton (Ills.) Company. The contract calls for the placing of complete coal gas apparatus, the purifiers to be operated by means of a duplex reversing and bye-pass valve. A new station meter and an ammonia concentrator will also be installed.

THE following circular letter recently issued by the Western Gas Construction Company, of Fort Wayne, Ind., explains itself—it was sent to all the erectors in the Company's employ:

"Mr. * * * * * * *. Dear Sir: Having organized a course of systematic study among the heads of departments here at home, we feel that something of this same nature should be carried on in connection with our erecting force; for the gas business has now reached a stage of development such that no man can get all there is in it, unless he be a careful student.

"We do not expect this matter will be taken up from a scientific standpoint at all, but we do feel that if each of our erectors would carefully look over such literature as we will send from time to time, that they will not only become better posted on the gas business in general, but increase the value of their own services, not only to us but to our friends, the gas companies, who are always looking for efficient superintendents.

"With the point in view of getting at the items that interest the gas superintendent, we have adopted the plan of sending each week a copy of the AMERICAN GAS LIGHT JOURNAL to each of our erectors. All of these copies will contain such marked articles as are especially interesting to erectors and gas construction men generally, and those marked articles we would like you to read carefully.

"Trusting you will see the unquestionable advantage that you may derive personally from following the course of reading here outlined.

We remain, yours very truly,

THE WESTERN GAS CONSTRUCTION COMPANY."

WE regret to have to announce the death of Mr. William A. Thompson, who died at his home in Troy, N. Y., the evening of February 15th. Mr. Thompson was born in Troy, February 2, 1834, and for 40 years or more was one of its substantial and respected residents. He served the Troy Gas Company as a Director faithfully and well for many terms.

AT the meeting for organization of the Directors of the Doylestown (Pa.) Gas Company, the following officers were chosen: President, Henry Lear; Secretary, Samuel Z. Freed; Treasurer, John Yardley.

THE following advertisement, which was recently printed in the advertising columns of the Wilmington (Del.) *Sun*, is reprinted without charge, for "the benefit of whom it may concern:"

"*Caution.*—All parties contemplating underwriting or purchasing securities based upon the property of the Wilmington (Del.) Coal Gas Company, are warned to carefully investigate the gas situation in Wilmington before doing so. The Oxy-Hydrogen Gas Company, of Wilmington, Del., is owned by my friends. Its works are practically finished and it will ultimately lay its pipes in the city of Wilmington. The result will undoubtedly be a prolonged gas war which will prevent the Wilmington Coal Gas Company from making any net earnings applicable to dividends or interests.—J. EDWARD ADDICKS."

A CORRESPONDENT forwards the following, under date of the 3d inst.: "Some interesting figures were given the stockholders of the Providence (R. I.) Gas Company at their annual meeting, held at noon yesterday. The figures were contained in the 56th annual report of the Board of Directors, who showed how the coal strike had affected the gas business in this city. The direct increase in the consumption of gas is shown in the figures for the fourth quarter of the year 1902, when nearly 66,000,000 cubic feet were consumed, against a little over 12,000,000 in the first quarter of the year. The Company is congratulated on proving itself equal to the unexpected demand for its product. The increase of capital stock is reviewed and the Directors said that they contemplate a large expenditure in the improvement and enlargement of the works for the coming year, and also an additional amount of large main pipes, to be laid as feeders to the outlying sections of the city. The stockholders elected the old list of Directors without change. They are William Goddard, Royal C. Taft, George W. R. Matteson, Newton D. Arnold, J. Edward Studley, Henry Pearce, John W. Ellis, Isaac C. Bates and Henry D. Sharpe. The Directors at a subsequent meeting re-elected the old board of officers, including John W. Ellis as President and General Manager; William Goddard as Vice-President, and William P. Nye as Treasurer and Secretary. At neither the meeting of the stockholders nor that of the Directors was any reference made to the proposed merger of the Company with the Naragansett Electric Lighting Company, talked of a few weeks ago. The report of President and General Manager, John W. Ellis, on the work of the past year was in part as follows: "The business and operation of the Company for the year 1902 have been marked by an unusual increase in the amount of gas made. as shown by the following statement: First quarter, 12,242,000 cubic feet; second quarter, 10,087,000 cubic feet; third quarter, 23,039,000 cubic feet; fourth quarter, 65,882,000 cubic feet, being a total for the year of 111,250,000 cubic feet, or 14.36 per cent. increase, nearly three times the increase for the year 1901. The total amount of gas made for the year was 885,826,000 cubic feet. This large and unexpected increase in the output of the company was largely due to the coal strike in the anthracite coal mines, and the shortage of coal in the city of Providence as a result of this strike made it convenient, desirable and economical for our consumers to use gas for heating as well as illuminating purposes. It will be seen that more than one-half of this unusual increase occurred in the fourth quarter of the year, and at times during the rapid increase of consumption the management was doubtful as to the ability of the capacity of the works to meet this unexpected requirement of its consumers. The Company is to be congratulated, however, that it had at all times, even in the last quarter of the year, sufficient reserve in the capacity of its works for manufacturing gas to meet all demands made upon it, and the consumers of the Company were fortunate that they could have sufficient gas of the same quality as heretofore sent out, and at the same price. The Company was fortunate in having a contract for its gas coal, but on account of the congestion in transportation facilities it required the utmost vigilance to procure sufficient coal, and was obliged once to go into the open market and pay high prices in order to keep the works in operation. The Company assured its regular customers of coke, particularly the bakers and jewelers, who were entirely dependent upon coke for the continuance of their business, that their wants would be attended to, and consequently was obliged to pay high prices for anthracite coal and petroleum carbon to make good its promises. To produce this amount of gas the following materials have been used: Gas coal 31,993 gross tons, Lehigh coal 3,517 gross tons, petroleum coke 576 net tons, Otto coke 26 net tons, gas naphtha 1,762,686 gallons, gas oil 1,013,959 gallons, coke 334,046 bushels. The following residuals have been sold: Coke 363,833 bushels, coal tar 435,716 gallons, ammoniacal liquor 1,436,890 gallons. The contract for coal was made at a slightly reduced price than in 1901, while the contract for naphtha and oil was about the same as in the year 1901. The amount obtained for residuals was $13,000 in excess of the year 1801. The distributing system has been extended during the year by laying 39,193 feet of main pipe, and 8,937 feet of pipe has been relaid. There are now 284¾ miles of main pipe. The number of services put in during the year was 965, and 150 old services were either relaid or relocated. The number of meters in use on Jan. 1, 1903, was 30,814, being an increase of 891 for the year. The number of gas stoves and heaters sold and installed by the Company was 3,267 for the year, being a total of 18,849. The management was fortunate in being able to procure sufficient stoves and heaters to meet the increased demand in the last quarter of the year. The capital stock of the Company was increased on July 1, 1902, from $2,750,000 to $3,000,000, and the directors, duly authorized, have created and issued 5,000 shares of new stock to the stockholders, ratably at the par value of $50 a share. A large expenditure in the improvement and enlargement of the works is contemplated for the coming year, and also an additional amount of large main pipes. to be laid as feeders to the outlying sections of the city."

THE Putnam (Conn.) Light and Power Company will expend quite a sum of money on plant extensions this season.

THE proprietors of the Dover, Port Oram and Rockaway (N. J.) Gas Company have leased commodious quarters in the Odd Fellows building, in Dover. They will take possession thereof April 1st.

MESSRS. JOHN W. SEIDELL and John A. Artley, of Akron, O., have petitioned the authorities of Barberton, O., for the right to there construct and operate a gas plant.

THE Hopewell Electric Light, Heat and Power Company, the Princeton Electric Works and the Princeton Gas Light Company, all of Princeton, N. J., have been merged under the title of the Princeton Lighting Company. The new concern is capitalized in $500,000 stock and $300,000 bonds. The officers of the Company are: Directors, Charles Le Barbier, Orrell A. Parker, Chase P. Fitch, Thomas B. Jackson, Jr., and Samuel H. Blackwell; President, C. P. Fitch; Vice-President, O. A. Parker; Secretary, T. B. Jackson, Jr.; Treasurer, Samuel H. Blackwell.

(*Continued on page* 374.)

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 42 Pine Street, New York.
Telephone, 2996 John.

TERMS:

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The JOURNAL is the official organ of the
NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.
AMERICAN GAS LIGHT ASSOCIATION.
WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.

Notification Respecting Advertising.—Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:

New York—American News Co. 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, MARCH 9, 1903.

(*Continued from page* 373.)

THE proprietors of the Lexington (Ky.) Gas Company recently issued the following notice: "Five per cent. discount will be allowed on all gas bills of $1 per month and upward, for either illuminating or fuel use, if paid at the office on or before the 5th of each month for the preceding month's bill. Bills will not be presented by collectors until after the 5th. Call at the office for your bill and make payment promptly if you wish to get the discount. Positively no discount allowed after the 5th."

MR. JOHN C. MCDOWELL, who has long been identified with the gas and oil business in and around Pittsburg, Pa., has been appointed General Manager of the Union Gas Company, which corporation is controlled by Mr. Theodore N. Barnesdell and associates.

SUPERINTENDENT CRAWFORD has completed the preliminaries in the instance of the improvements that are to be made this year on the plant of the Sterling (Ills.) Gas and Electric Light Company.

A CORRESPONDENT writes that the Fuel Gas Company, projected for Boise City, Idaho, proposes to construct a plant there this summer. The President (Mr. H. P. Ustock) says that he has secured the signatures of 400 residents as customers, and he estimates that the plant can be erected for $50,000. Gas will be distributed for fuel use only.

THE residents of Lewiston, Ills., are anxious that a gas plant shall be erected in that place.

THE proprietors of the La Grange (Ills.) Gas Company are preparing to issue a mortgage amounting to $500,000. The bonds are to run for 40 years and are to bear 5 per cent. interest. The proceeds will be used to retire the Company's outstanding indebtedness and to provide money for extensions.

The Market for Gas Securities.

The "striking" features regarding proposed gas legislation at Albany, and the ludicrous crusade of a local paper against "the extortions" of the Consolidated Gas Company, we presume are responsible for a part of the decline in Consolidated, the other "part" being chargeable to the weakness in the general market. The closing to-day (Friday) was 210½ to 211. Don't go "short."

Brooklyn Union is dull, and the quotations for it (216 to 224) are altogether nominal. Baltimore Consolidated is practically unchanged, and its near neighbor (Washington, D. C. gas) is 416 bid; 500, and that soon, may be looked for in this security. The Louisville (Ky.) Gas Company has agreed to sell the Louisville Electric Light Company to a new corporation, to be known as the Louisville Lighting Company, which concern will also absorb the Citizens Lighting Company, of Louisville. These prices are to be paid for the respective transfers: Louisville Electric Light Company, $1,600,000 fifty year 5 per cent. gold bonds, and $1,666,700 capital stock; Citizens Lighting Company, $900,000 bonds and $1,333,300 capital stock. The total capital authorized issue of the Louisville Lighting Company is: Bonds, $4,000,000; stock, $3,000,000. San Francisco Gas and Electric stock is advancing.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

MARCH 9.

☞All communications will receive particular attention.

☞The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$73,177,000	100	210½	211
Central Union, Bonds, 5's	3,000,000	1,000	109	111
Equitable Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	310	325
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. ..				
Bonds, 5's	11,000,000	1,000	112½	113
Northern Union, Bonds, 5's.	1,250,000	1,000	106	107
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	109	111
Standard	5,000,000	100	131	..
Preferred	5,000,000	100	152	..
Bonds, 1st Mortgage, 5's	1,500,000	1,000	115½	118
Yonkers	299,630	500	130	.
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	216	224
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	⅜	½
" Income Bonds	2,000,000	1,000	..	75
Binghamton Gas Works	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	7½	10
" " Bonds, 5's	5,256,000	1,000	75	77
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Central San Francisco	900,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co.	29,500,000	100	102	102⅜
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	101	101⅛
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¾	89¼
Preferred	3,026,500	100	107⅛	109
Consumers, Jersey City Bonds	600,090	1,000	103	106
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore	11,000,000	100	70⅛	71
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	..	112
Consolidated Gas Co. of N.J.	1,000,000	100	15	17
" Con. Mtg. 5's	880,000	1,000	85	87
Consolidated G. & E. Co.'s. Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	..	89
" Prior Lien 5's	5,603,000	1,000	99⅛	100
Detroit Gas Co., 5's	351,000	1,000	77	79
" Inc. 5's	16,000	100	98½	100
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	34	38
Fort Wayne	2,000,000	..	..	..
" Bonds	2,000,000	..	55	..
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104⅛	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	80	90
" Bonds, 6's	2,650,000	..	103¾	104¼
Jackson Gas Co	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	99	99¼
Preferred	2,500,000	100	105	110
Bonds	10,000,000	1,000	109⅛	110
Lafayette Gas Co., Ind.	1,000,000	100	..	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	130	140
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	107½	108¼
" 6 per cent. scrip, due 1910	100,000	25	85	87
Montreal, Canada	2,000,000	100	218	184¾
Nashville Gas Lt. Co.	1,000,000	100	110	..
Newark, N. J., Con. Gas Co	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	300	325
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	101⅛	101¾
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	50	51
St. Joseph Gas Co.				
" 1st Mtg. 5's	751,000	1,000	95	96½
St. Paul Gas Light Co	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	2,465,000	1,000	92	93
Syracuse, N. Y.	1,975,000	100	42	45
Bonds	2,047.000	1,000	99	100
Washington, D. C	2,500,000	20	416¼	417
First mortgage 6's	600,000	..	..	..
Western, Milwaukee.				
Bonds, 5's	4,000,000	..	109⅛	110
Wilmington, Del.	600.000	50	232	..

STOCKHOLDERS' MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., February 27, 1903.

The Annual Meeting of the Stockholders of the United Gas Improvement Company will be held at the office of the Company, northwest corner of BROAD AND ARCH STS., PHILADELPHIA, on Monday, May 4, 1903, at 12 o'clock, noon, for the purposes of electing a President and six Directors, to serve for the ensuing year, considering and acting upon the subject of a proposed increase in the capital stock of the Company from 565,000 shares, of the par value of $50 each, to 734,500 shares, of the par value of $50 each and transacting such other business as may properly come before the meeting.

The stock transfer books will be closed from 3 P.M., April 28, until 9 A.M., May 5th.

By order of the Board of Directors.

1448-8 LEWIS LILLIE, Secretary.

MISS LILY HAXWORTH,
Cooking Teacher and Lecturer,
(GOLD MEDALLIST),
Is open for engagements. For terms, etc.,
1441-3m Address 323 QUINCY ST., BROOKLYN, N. Y.

Position Wanted
By a Practical and Experienced Man
in all details in connection with the gas business; construction, manufacturing, distribution and office work. Correspondence solicited. Address, "EXPERIENCE,"
1448-tf Care this Journal.

PRACTICAL.
Young Gas Man Wishes Position
With some gas company as superintendent, assistant superintendent or foreman. Fifteen years' experience in all branches, both coal and water gas, and construction. References.
1448-1 Address, "G. E.," care this Journal.

SITUATION WANTED
As Manager of Coal Gas Plant
In town of 25,000 or less. Am now employed as manager of gas and electric light company, but have best of reasons for wishing to change. Address, "B. Z.,"
1447-5 Care this Journal.

WANTED,
A GAS SUPERINTENDENT.
A man under 45 years of age can secure a position as superintendent of a gas plant in a city of 30,000 inhabitants (putting out 60,000,000 cubic feet of gas per annum), if he is experienced and competent. The possibilities of the position will command the attention of any good gas man.
1447-tf Address, "B.," care this Journal.

SOLICITORS WANTED.
FIVE EXPERIENCED SOLICITORS.
State experience and salary expected.
Address, "A. B. C.,"
1448-1 Care this Journal.

ENGINEER WANTED.
Gas Company Wants an Engineer with New York City License.
Must be able to do his own machine work. Address, stating age, experience and salary expected, "C. T. S.,"
1448-1 Care this Journal.

FOREMAN WANTED,
By a Company Operating a Small, but Well-Equipped Coal Gas Works.
Must understand manufacture and distribution, and be a worker. None other need apply. A good job for the right man. Address, "FOREMAN."
1448-tf Care this Journal.

WANTED TO PURCHASE SECOND-HAND.
Four 8 by 10 by 3 Purifying Boxes, with dry centerseal.
One Mackenzie Exhauster, with engine.
One Station Meter, about 4 feet 6 inches.
One Scrubber and one **Multitubular Condenser,** with 8 or 10-inch connections. Send particulars and prices to "PRESIDENT."
1448-1 Care this Journal.

Apparatus Wanted.
A 5 or 6-foot Station Meter.
A 60-inch Bar Photometer.
A medium sized Meter Prover.
Must be in good condition.
1447-2 Address, "MANUFACTURER," care this Journal.

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18	lengths,	12-inch,	cast	iron	pipe.	
90	"	10	"	"	"	"
60	"	8	"	"	"	"

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"CITIZENS,"
1444-6 Care this Journal.

FOR SALE.
Four Purifying Boxes, 8 feet by 12 feet by 3 feet.
24-Inch Seal in Line, complete with connections.
Hydraulic Lift for Covers and Track.
Address, THE CHUCTANUNDA GAS LIGHT COMPANY,
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Utilize Your Gas Liquor.
NO EXTRA LABOR OR OPERATING EXPENSES.
IMPROVED AMMONIA CONCENTRATOR.
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Manufacturers of the very best quality of Clay Retorts, Blocks, Tiles, Settings and Firebrick of every description.
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We will send one or more lamps on 30 days' trial to Gas Companies who maintain the lamps. Write for quotations and circulars. We will save you money.

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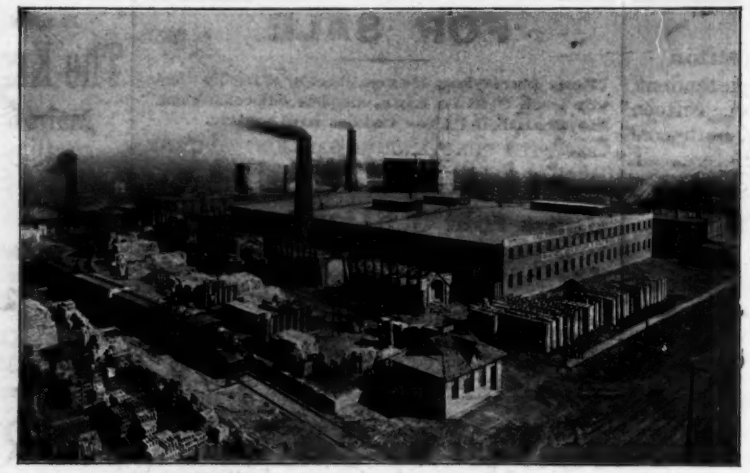

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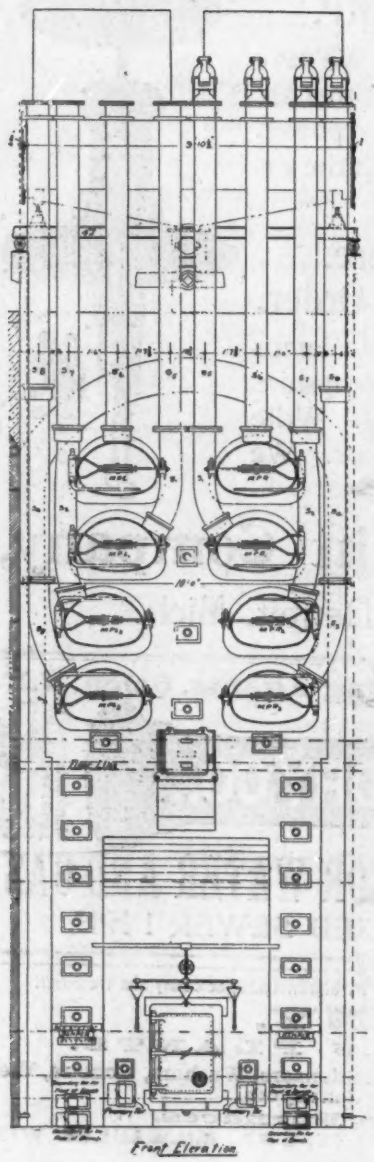

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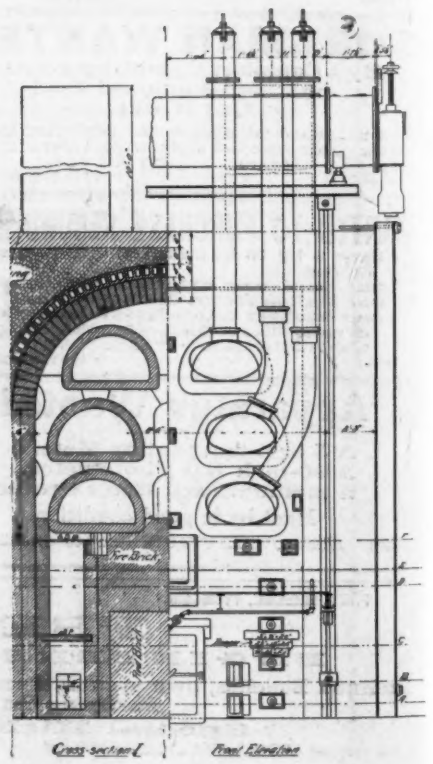
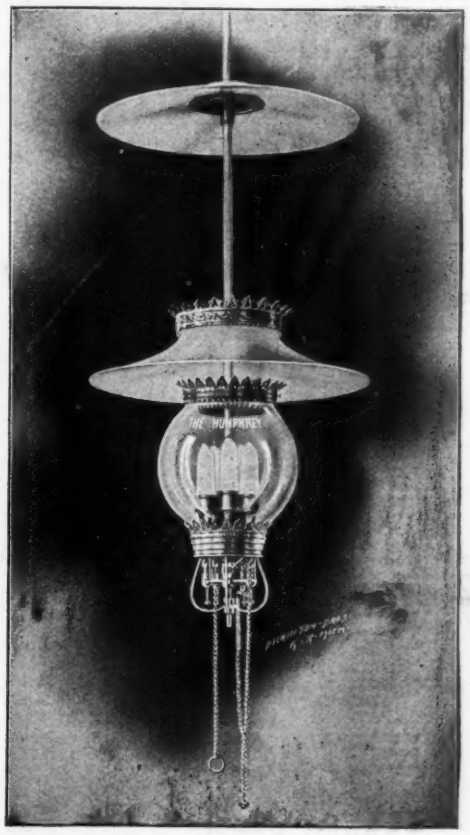


Cross-section

Front Elevation



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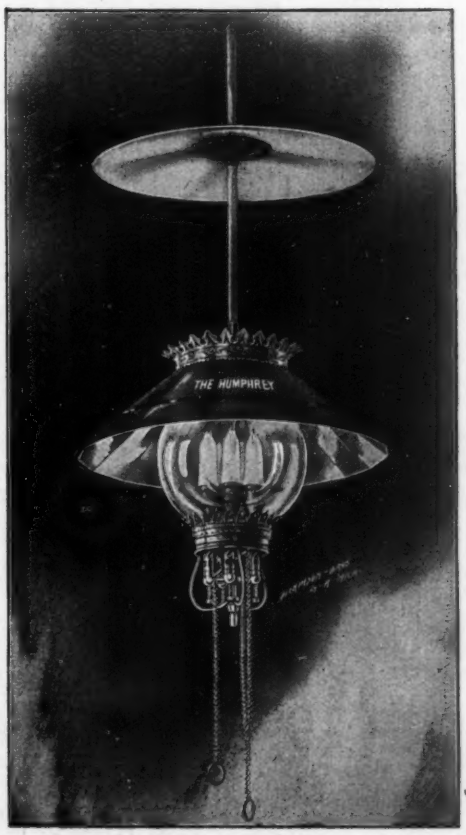
For Store Lighting with One MANTLE NIGHT LAMP.

The HUMPHREY, THE LIGHT THAT'S RIGHT.



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General Gas Light Co.,

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"MAURICE GRAHAM" SYSTEM OF

INCLINED RETORT

INSTALLATIONS COMPLETE.

WE HAVE A STAFF OF EXPERIENCED AND TRAINED ENGINEERS TO ERECT THIS SYSTEM.

THE ONLY INCLINED RETORT INSTALLATIONS IN THE WORLD WITH 9 RETORTS PER SETTING 20 FEET LONG (IN ACTION) ARE ERECTED ON THIS SYSTEM.
NOW OPERATING AT EDINBOROUGH, LEEDS, MILAN, PARIS, LONDON, ETC.

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FOR QUENCHING AND DRYING THE COKE DURING TRANSIT.

See Articles in AMERICAN GAS LIGHT JOURNAL, February 9th and 16th, 1903.

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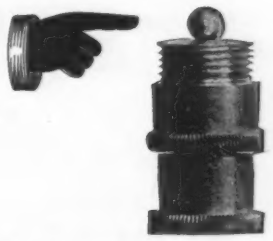
See that Ball?



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A simple little device which fits any mantle burner, is instantly adjusted by a slight twist to the right or left.

THE BALL CHECK

will fit the burner you are now using, and you can easily put it on yourself, without tools. It replaces the usual long mixing tube with a Bunsen burner only an inch and a half long. Makes any burner as good as new, obtaining as high as 200-candle power from one burner. By checking and spreading the gas supply, the Ball Check secures brighter light with less gas.

The Ball Check alone, 25 cents; Ball check burner with mantle, 75 cents—at any good store, or of us, postage prepaid.

Illustrated information free. Call or write,

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16 & 18 Park Place, - New York.

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Estimates Furnished on any kind of Work in Connection with Gas or Water Plants.

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6 SIZES. 5 PRESSURES.

Made with a check to consume rated amounts accurately.

SIZES, - 1½, 2, 3, 4, 5, 6 feet. - - - PRESSURES, - 8/10, 12/10, 15/10, 20/10, 25/10.

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Gas Analyses of All Sorts and Conditions,

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Analyses of Solid and Liquid Materials as Well,

That are needed by Gas Companies at any time in the conduct of their business, may be obtained from

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Gas properties,
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Street railway properties.
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Their Construction and Arrangement,

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Originally written by SAM'L HUGHES, C.E.
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Eighth Edition, Revised, with Notices of Recent Improvements.

Price, $1.65.

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AUTOMATIC SCALES

Send for Catalogue.

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GAS BURNERS,

To burn a given amount at a stated pressure, made to order. Samples furnished. Also, small oil and air valves, slow-feed valves for high pressure, and small brasswork in general.

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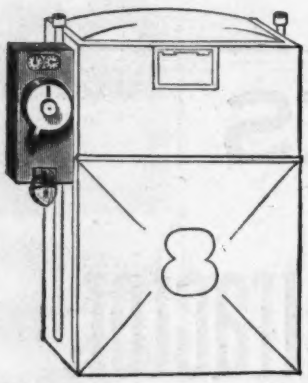
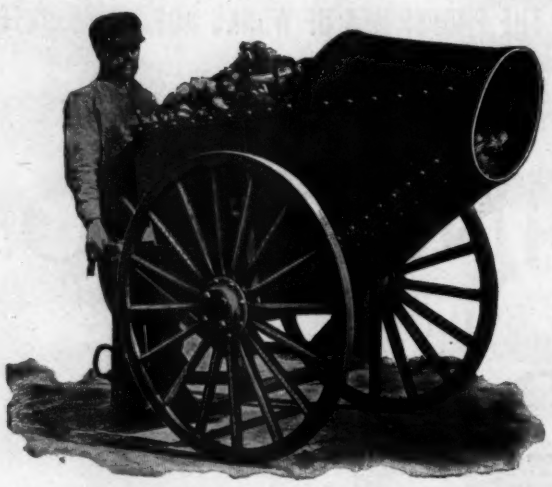


A PERFECT PREPAYMENT ATTACHMENT.

PERFECTION is a big statement, but write for sample of the "REEVES" Prepay and see if we substantiate the claim. :: :: :: :: :: :: :: ::

Gives consumer more than 10 hours' warning before gas goes out. Ten dollars can be prepaid at one time. Can be fitted to any make of meter. Device cannot be "beaten." :: :: :: :: :: :: :: :: :: :: :: :: :: ::

REEVES MFG. CO., - - - NEW HAVEN, CONN.



Charging Barrows,
Coal and
Coke Wagons,
Steel Wheelbarrows.

All Specially Adapted for Use in Gas Works.

THE AKRON CULTIVATOR CO.,
MANUFACTURERS,
Akron, O.

The Gas Engineer's Laboratory Handbook,

By JOHN HORNBY, F.I.C.

Price, $2.50.

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42 Pine Street, New York City.

PRACTICAL HANDBOOK ON GAS ENGINES, WITH INSTRUCTIONS FOR CARE AND WORKING OF THE SAME,

By G. LIECKFELD, C.E. Translated with Permission of the Author, by GEO. M. RICHMOND, M.E. Price, $1.00.

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Of Uniform Excellence and Greatest Candle Power.

BEWARE OF IMITATIONS.

WILLIAM M. CRANE CO.,

1131-1133 Broadway, New York,

SOLE AGENTS FOR UNITED STATES.

Have you seen Bray's new "LUTA" burner for acetylene gas?

"THE MINER"

Globe Street and Boulevard Lamps.

Cheapest and Best.

THOUSANDS IN USE WITH INCANDESCENT BURNERS.

Send for Catalogues.

THOMAS T. W. MINER,

821-823 Eagle Av., N.Y.

COAL HANDLING MACHINERY.

We supply complete equipment for unloading Vessels or Cars, placing the Coal in Storage Pockets and supplying it to the retort houses. Automatic, Simple and Durable. This has been our special line for 31 years

Particular attention given where peculiar and unfavorable conditions exist.

We shall be pleased to furnish full particulars upon application.

C. W. HUNT CO., West New Brighton, Staten Island, N. Y.

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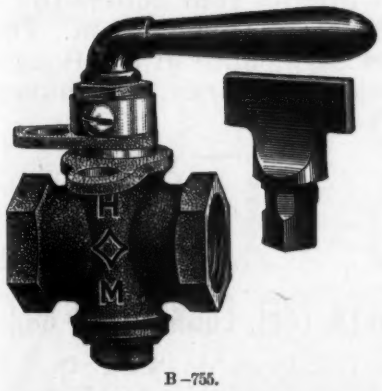


B–755.

TOO little is not as much as you pay for, and too much is more paid for than you need.

In **Mueller Gas Cocks** you find a happy medium--not so little metal as to leave them weak, nor yet so much as to make them costly.

Made in 145 styles, seven sizes in each style.

MADE ONLY BY

H. MUELLER MFG. CO.,

DECATUR, ILLS., U. S. A.

THE

Ludlow Valve Mfg. Co.,

TROY, N. Y., U. S. A.

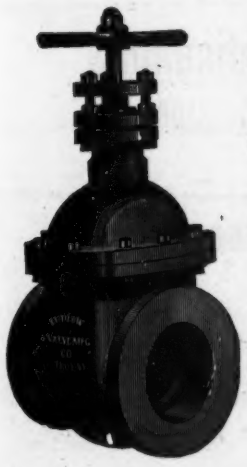
Double and Single Gate Valves, ¼" to 72",

—FOR—

Gas, Water, Steam, Oil, Ammonia, Etc.

HOT GAS VALVES A SPECIALTY.

Send for Catalogue.



Cox's High Pressure Fluid Discharge Computer.

This Computer solves the following formula, which is applicable to Gas, Air and other elastic fluids, flowing through long pipes with high initial pressures:

Discharge in cubic feet per hour at atmospheric pressure $= 33.3 \sqrt{\frac{d^5 \times (p_1^2 - p_2^2)}{L \times w}}$

Where

d = diameter of pipe in inches,

p_1 = absolute initial pressure in pounds per square inch,

p_2 = absolute terminal pressure in pounds per square inch,

L = length of pipe in miles,

w = specific gravity of the fluid when air = 1.

To Find the Discharge from a Pipe and the Required Size of Pipe.

(1.) Set the specific gravity of the fluid opposite the length of pipe;

(2.) Bring the DIFFERENCE of the initial and terminal gauge pressures opposite the SUM of the initial and terminal gauge pressures;

(3.) Opposite any diameter of pipe will now be found the discharge in cubic feet per hour at atmospheric pressure; and

(4.) Opposite any desired discharge will also be found the required diameter of pipe.

Price of the Computers, in Cloth Case, 6½ x 8 inches, $5 Each, Net.

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A. M. CALLENDER & CO., 42 Pine Street, New York City.

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DETROIT, MICH.

LOWE DOUBLE SUPERHEATER WATER GAS APPARATUS.

Coal Gas Condensing and Scrubbing Apparatus.
Purifiers with Plain or Reversing Center Valves.
The Lloyd System of Valve Connections.
PLAIN OR REVERSING (PATENT APPLIED FOR).
Oxide, Coal and Coke Elevators and Machinery.
Pipe Specials, all sizes. A. G. L. Asn. Standard.
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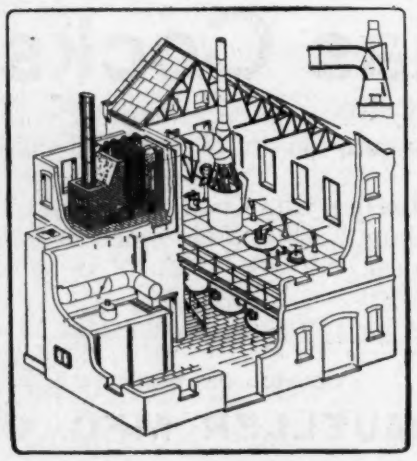
COAL GAS CONDENSATION SYSTEM. THE "MAYER" PATENTED TAR EXTRACTOR. THE STANDARD ROTARY WASHER-SCRUBBER. STETTIN SYSTEM INCLINED BENCHES, HYDRAULIC VALVES, ETC., ETC.

Economize Heat in Water Gas Plants,

BY UTILIZING A

Green's Economizer,



To absorb the heat now going to waste when you blow through your superheater to heat the feed water for your boilers to the temperature of the steam. This is now being done at the Poughkeepsie Gas Works, Poughkeepsie, N. Y. : : : : :

Write for full particulars how this is accomplished, the saving effected, and the advantages gained, to the

GREEN FUEL ECONOMIZER CO.,

MATTEAWAN, N. Y.

GASHOLDER TANKS AND GAS WORKS MASONRY COMPLETE

Plans prepared and Estimates furnished at short notice.

J. P. WHITTIER,

938 Java Street, Brooklyn, N. Y.

GEORGE R. ROWLAND,

Formerly with the Continental Iron Works.

Draughtsman and Constructing Engineer.

Drawings, Specifications and Estimates furnished for the construction of new works or alteration of old works. Special attention given to Patent Office drawings.

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Chollar's System of Gas Purification.

THE PURIFIED GAS REVIVES THE FOULED OXIDE.

THE GAS ENGINEERS' POCKET-BOOK.

By Henry O'Connor,

Comprising Tables, Notes and Memoranda relating to the Manufacture, Distribution and Use of Coal Gas, and the Construction of Gas Works.

PRICE, $3.50.

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SYSTEM OF

Inclined Retorts.

ZIMMER SWINGING CONVEYORS,

FOR HANDLING COAL OR COKE.

Jones Jet Photometer.

GAS SPECIALTIES.

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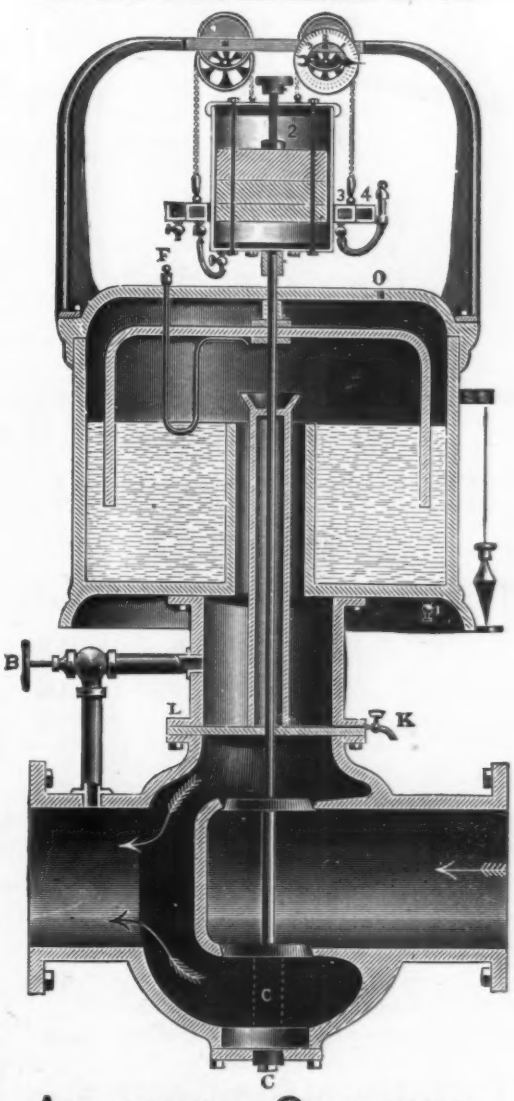

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MODEL OF 1900.

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"Globe" Specials Valves, Etc. "Glahorgan" Fire Hydrants

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MANUFACTURERS OF

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Also, FLANGE PIPE, LAMP POSTS, Etc.

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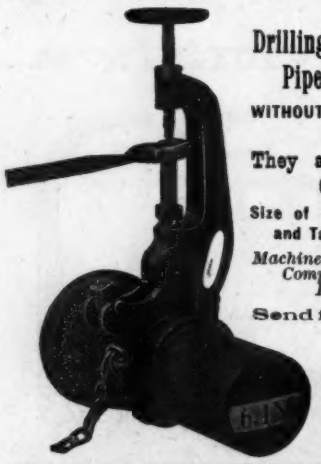

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Drilling and Tapping Pipe under Pressure

WITHOUT ANY ESCAPE OF GAS.

They are Strong and Compact.

Size of Combination Drills and Taps ¾ to 4-inch.

Machines Sent to any Gas Company for Thirty Days' Trial.

Send for Circulars.

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THE ECONOMICAL GAS APPARATUS CONSTRUCTION COMPANY, LIMITED,

Engineers and Builders of water and coal gas apparatuses and general gas works machinery. : : :

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THE
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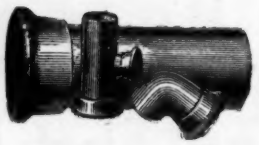

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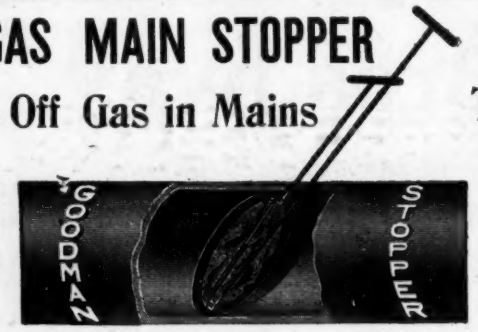
FROM THREE TO FORTY-EIGHT INCHES DIAMETER. ALSO, ALL SIZES OF

Flange Pipe for Sugar House and Mine Work. Branches, Bends, Retorts, etc., etc.

SAFETY GAS MAIN STOPPER COMPANY,

For Shutting Off Gas in Mains

Any size gas main can be shut off in 30 seconds. : : :



Temporarily during alterations and repairs. : : : :

STOPPERS SENT ON TRIAL.

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Humphrey Crescent Instantaneous Water Heaters,

A LUXURY and NECESSITY.

This is Our No. 2 Heater.

Supplies hot water for domestic use as well as for the bath.

It Has No Equal

LIST PRICE NICKEL PLATED, $35.00,

including nickel plated shelf and brackets.

We have many styles, which range in price from our No. 10, at $45.00, to our No. 8, at only $20.00.

Every Heater Guaranteed.

SEND FOR CATALOGUE AND PRICES.

Will send heater on 60 days' trial to any Gas Company.

The Humphrey Manufacturing and Plating Company, KALAMAZOO, MICH., U.S.A.

Parson's Steam Blower

FOR IMPROVING BAD DRAUGHT IN BOILERS, AND FOR BURNING BREEZE OR OTHER WASTE MATERIAL.

PARSON'S TAR BURNER,

FOR USING COAL TAR AS FUEL.

PARSON'S AIR JET TUBE CLEANER,

FOR CLEANING BOILER TUBES.

These devices are all first-class. They will be sent to any responsible party *for trial.* No sale unless satisfactory. Manufactured by the WATERTOWN STEAM BLOWER COMPANY.

H. E. PARSON, Supt., 457 Putnam Ave., Brooklyn, N. Y.

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ESTABLISHED 1834. INCORPORATED 1863.

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PHILADELPHIA,
CHICAGO,
ST. LOUIS,
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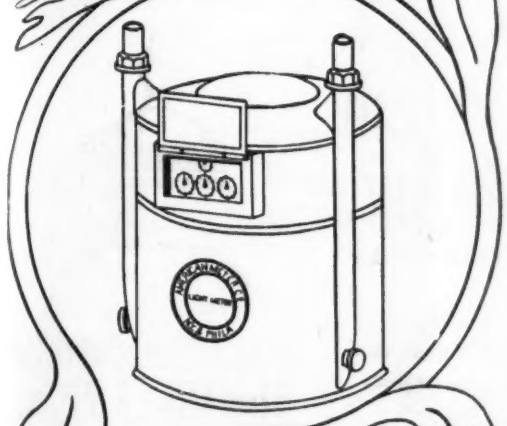
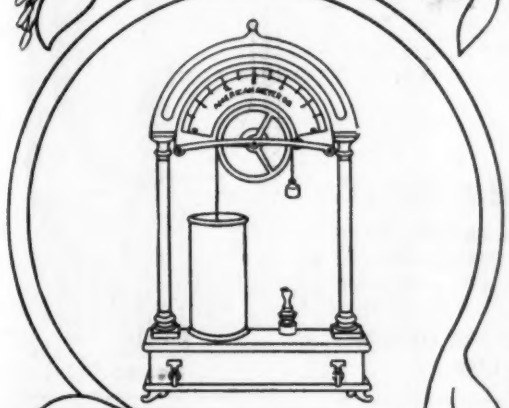
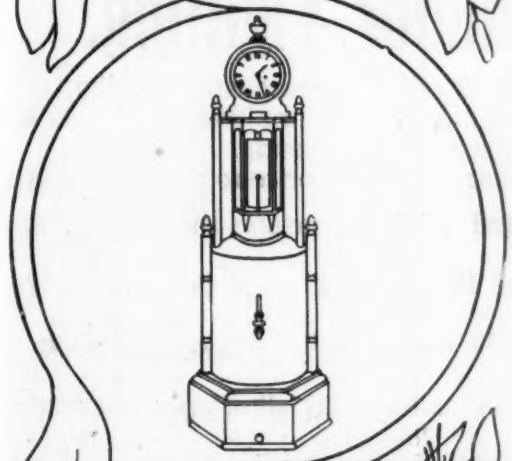
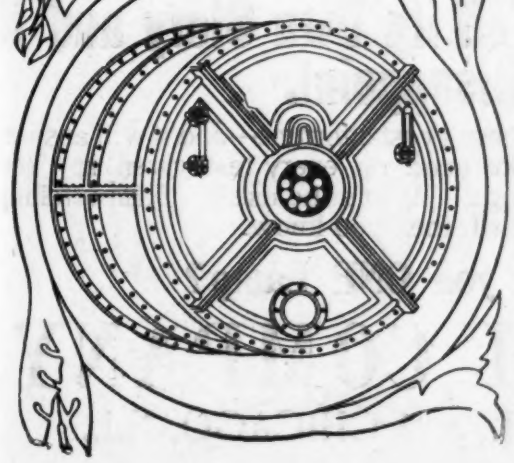








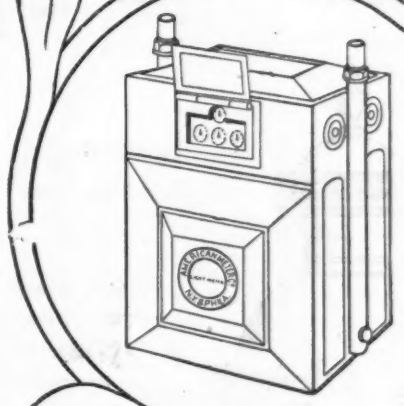
PUBLIC LIGHTING TABLE.

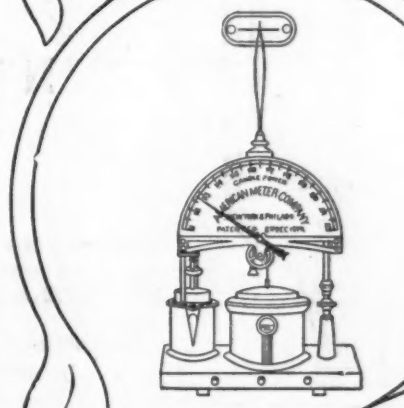
MARCH, 1903.

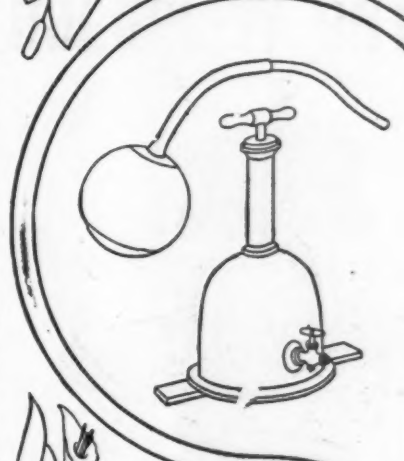
Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Sun.	1	6.20 PM	5.30 AM	5.30	5.45
Mon.	2	6.20	5.30	5.30	5.45
Tue.	3	9.30	5.30	5.30	5.45
Wed.	4	10.30	5.30	5.30	5.45
Thu.	5	11.30	5.30	5.40	5.35
Fri.	6	12.30 AM FQ	5.30	5.40	5.35
Sat.	7	1.30	5.30	5.40	5.35
Sun.	8	2.20	5.20	5.40	5.35
Mon.	9	3.10	5.20	5.40	5.35
Tue.	10	3.50	5.20	5.40	5.35
Wed.	11	No L.	No L.	5.40	5.35
Thu.	12	No L. FM	No L.	5.50	5.20
Fri.	13	No L.	No L.	5.50	5.20
Sat.	14	6.40 PM	8.40 PM	5.50	5.20
Sun.	15	6.40	9.40	5.50	5.20
Mon.	16	6.40	10.40	5.50	5.20
Tue.	17	6.40	11.40	5.50	5.20
Wed.	18	6.40	12.40 AM	5.50	5.20
Thu.	19	6.40	1.30	6.00	5.10
Fri.	20	6.40 LQ	2.20	6.00	5.10
Sat.	21	6.40	3.00	6.00	5.10
Sun.	22	6.50	3.40	6.00	5.10
Mon.	23	6.50	4.20	6.00	5.10
Tue.	24	6.50	5.00	6.00	5.10
Wed.	25	6.50	5.00	6.00	5.10
Thu.	26	6.50	5.00	6.10	4.55
Fri.	27	6.50	5.00	6.10	4.55
Sat.	28	6.50 NM	5.00	6.10	4.55
Sun.	29	6.50	4.50	6.10	4.55
Mon.	30	6.50	4.50	6.10	4.55
Tue.	31	6.50	4.50	6.10	4.55

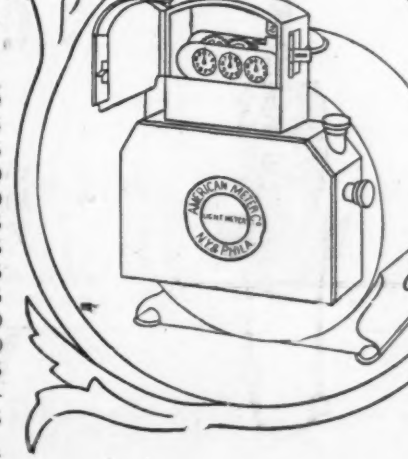
TOTAL HOURS LIGHTING DURING 1903.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	245.00	January	423.20
February	192.00	February	355.25
March	201.00	March	355.35
April	167.20	April	298.50
May	152.00	May	264.50
June	131.00	June	234.25
July	140.40	July	243.45
August	156.20	August	280.25
September	171.20	September	321.15
October	198.20	October	374.30
November	216.30	November	401.40
December	232.10	December	433.45
Total, yr.	2203.40	Total, yr.	3987.45





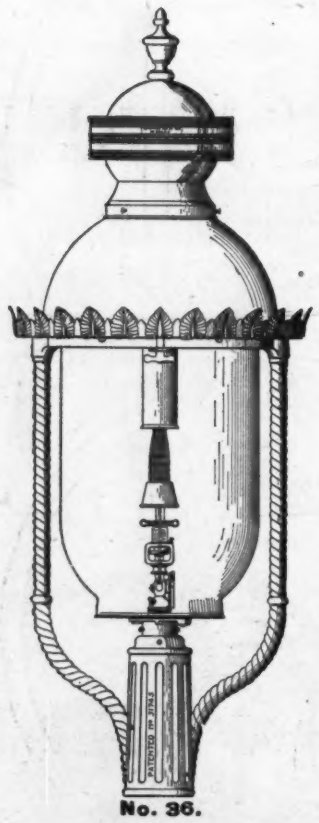




NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

WELSBACH STREET LIGHTING COMPANY

.... OF AMERICA ....



No. 36.

Controls and Operates the

Welsbach System of Street Lighting,

Which includes its specially DESIGNED AND PATENTED BURNER for STREET and PARK LIGHTING exclusively.

Uniformly SUCCESSFUL in 150 Cities and Towns.

By means of the Welsbach System of street lighting the superiority of GAS over electricity for street lighting has been fully demonstrated.

POINTS OF MERIT:

It is { Economical, Attractive, Successful, Up-to-date.

IT LIGHTS THE STREET.

Where there are no gas mains we can furnish an equally good light by our SELF-GENERATING NAPHTHA WELSBACH BURNER, and thereby supply a uniform light in all localities.

Correspondence Solicited from Gas Companies and Others Interested in Municipal and Outside Lighting.

No. 38.

The Welsbach Gas Arc for Indoor Lighting.

The cut tells the story—but not all of it. Get one lamp and light it—then the tale's told from beginning to end. For one Welsbach Gas Arc Lamp is a better salesman than 20 pages of advertising.

Here's what it would show if you give it a chance to prove its worth:

1. A mechanical construction and finish that insures the greatest durability.
2. The renewal of mantles and the cleaning of globes without removal of globe.
3. The greatest amount of candle power with least consumption of gas.
4. A by-pass cock so constructed as to permit all or only one mantle burning at a time.
5. A pilot light that consumes but 1 foot of gas in 24 hours. Costs $\frac{1}{10}$ of a cent a day.

Give it a Chance to Tell its Own Story and it Won't Disappoint.

Let us send you one lamp—doesn't cost a fortune—and it will answer every question you put to it; make good on every test given it. You know the only proof of the pudding? What's the use in a fellow telling you it tastes good? Taste it yourself, then you know.

May we Send you ONE Lamp?

WELSBACH COMPANY,

GLOUCESTER, N. J., and CHICAGO, ILL.

THE UNITED GAS IMPROVEMENT COMPANY

During the Year 1902 has been Awarded Contracts in the Following Places for

Standard Double-Superheater Lowe Water Gas Apparatus.

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Ardmore, Pa.	Hollidaysburg, Pa.	Norwalk, O.
Auburn, N. Y.	Houston, Tex.	Ocean City, N. J.
Belmar, N. J.	Indianapolis, Ind.	Oklahoma City, O. T.
Blue Island, Ills.	Jersey City, N. J.	Oneonta, N. Y.
Boonton, N. J.	Laconia, N. H.	Plainfield, N. J.
Brooklyn, N. Y.	Lakewood, N. J.	Portland, Me.
Carlisle, Pa.	La-Salle-Peru, Ills.	Pottsville, Pa.
Champaign, Ills.	Martinsville, Ind.	Scranton, Pa.
Coney Island, N. Y.	Memphis, Tenn.	South Brooklyn, N. Y.
Dallas, Tex.	Newark, N. J.	Suffern, N. Y.
Danville, Ills.	New Brunswick, N. J.	Swedesboro, N. J.
Des Moines, Ia.	New London, Conn.	Syracuse, N. Y.
Evanston, Ills.	New Orleans, La.	Washington, N. C.
Evansville, Ind.	Norfolk, Va.	Woonsocket, R. I.

TOTAL SETS, 1902, ... 51
TOTAL DAILY CAPACITY, 1902, . . 32,825,000 cubic feet.
TOTAL SETS TO DATE, ... 447
TOTAL DAILY CAPACITY, ... 299,670,000 cubic feet.

The United Gas Improvement Company,

Broad and Arch Streets, Philadelphia.

Established 1858. Incorporated 1890.
CHAS. E. GREGORY, Prest. DAVID R. DALY, V.-Prest. & Treas.
H. D. ABERNETHY, Sec.

J. H. Gautier & Co.

Greene & Essex Streets,
Jersey City, N. J.

MANUFACTURERS OF

CLAY GAS RETORTS, FIRE CLAY TILES, FIRE BRICK and FIRE CLAY SPECIALTIES.

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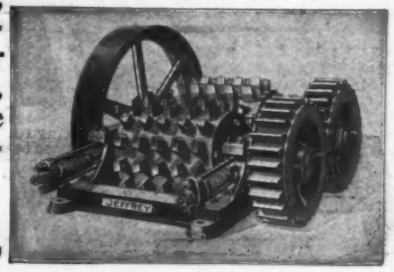

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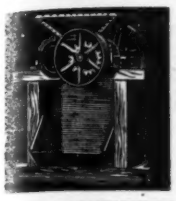

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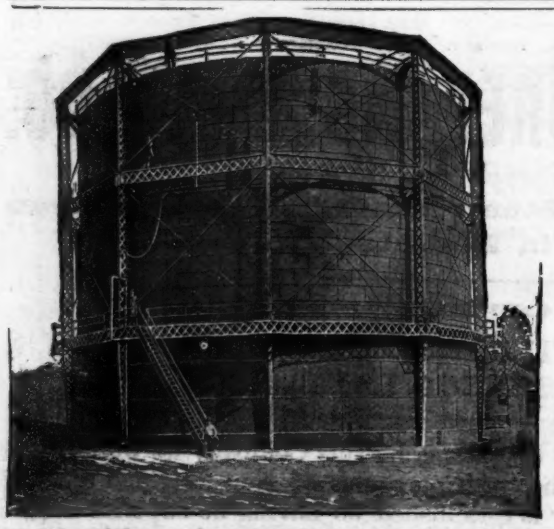

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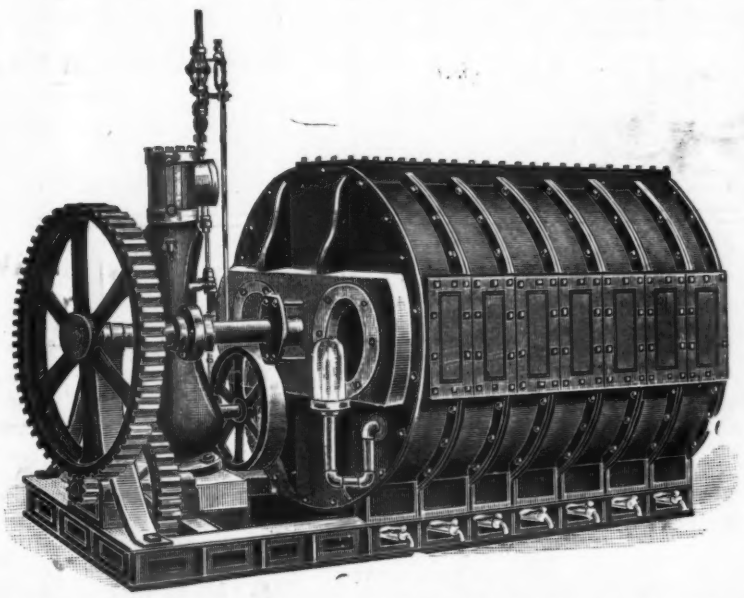

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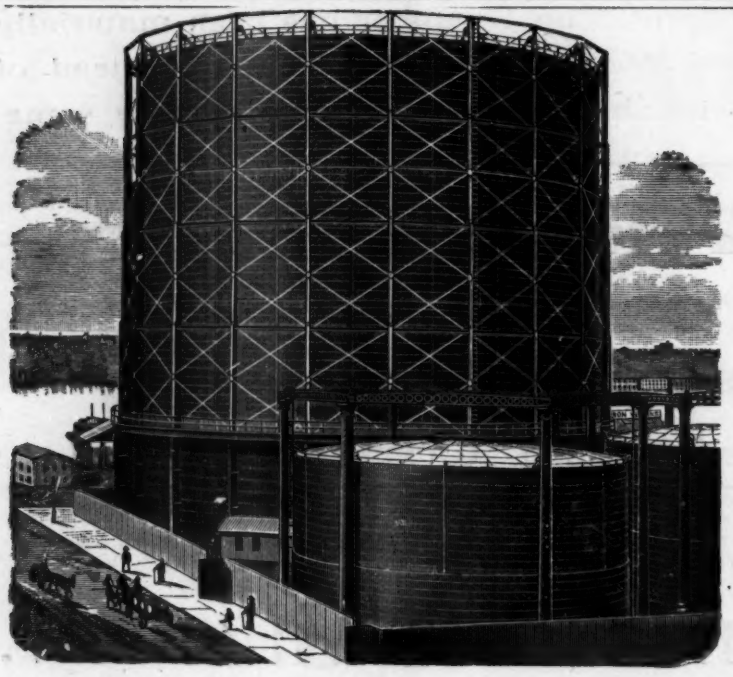

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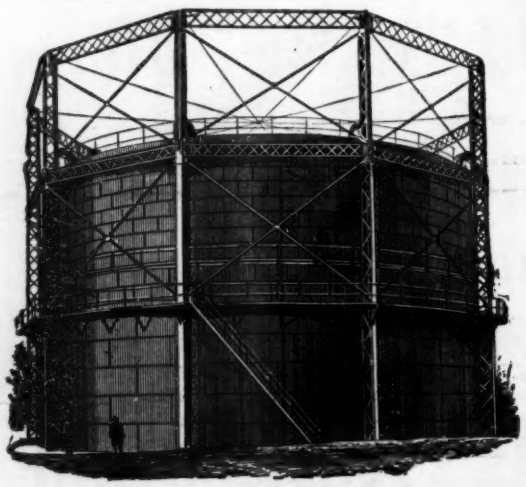

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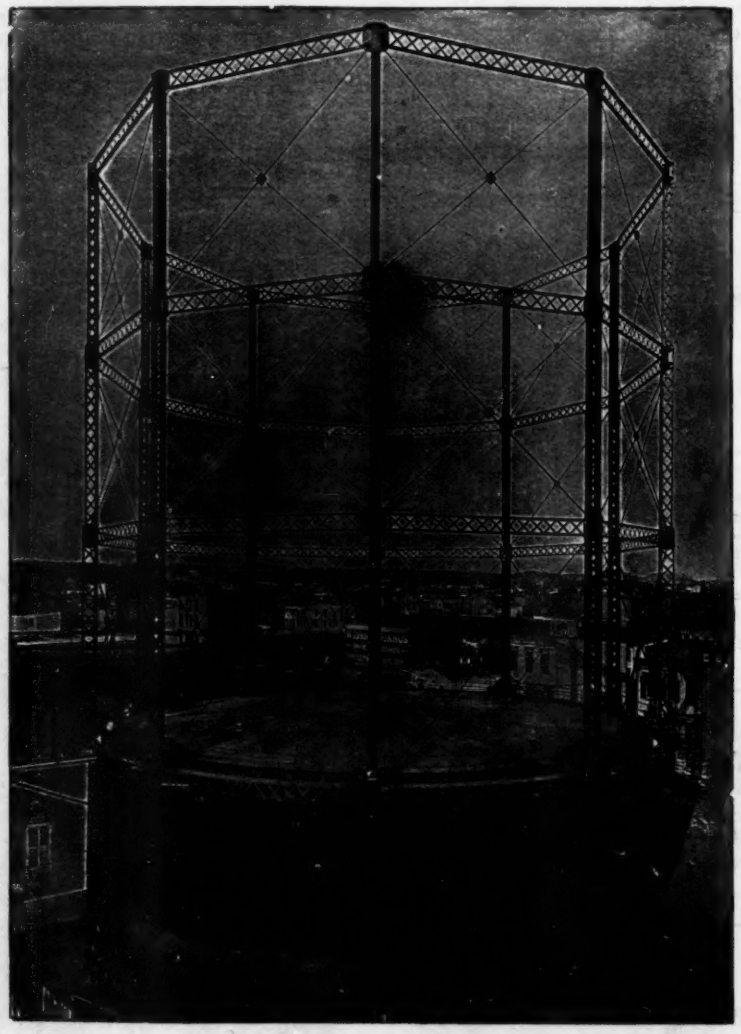

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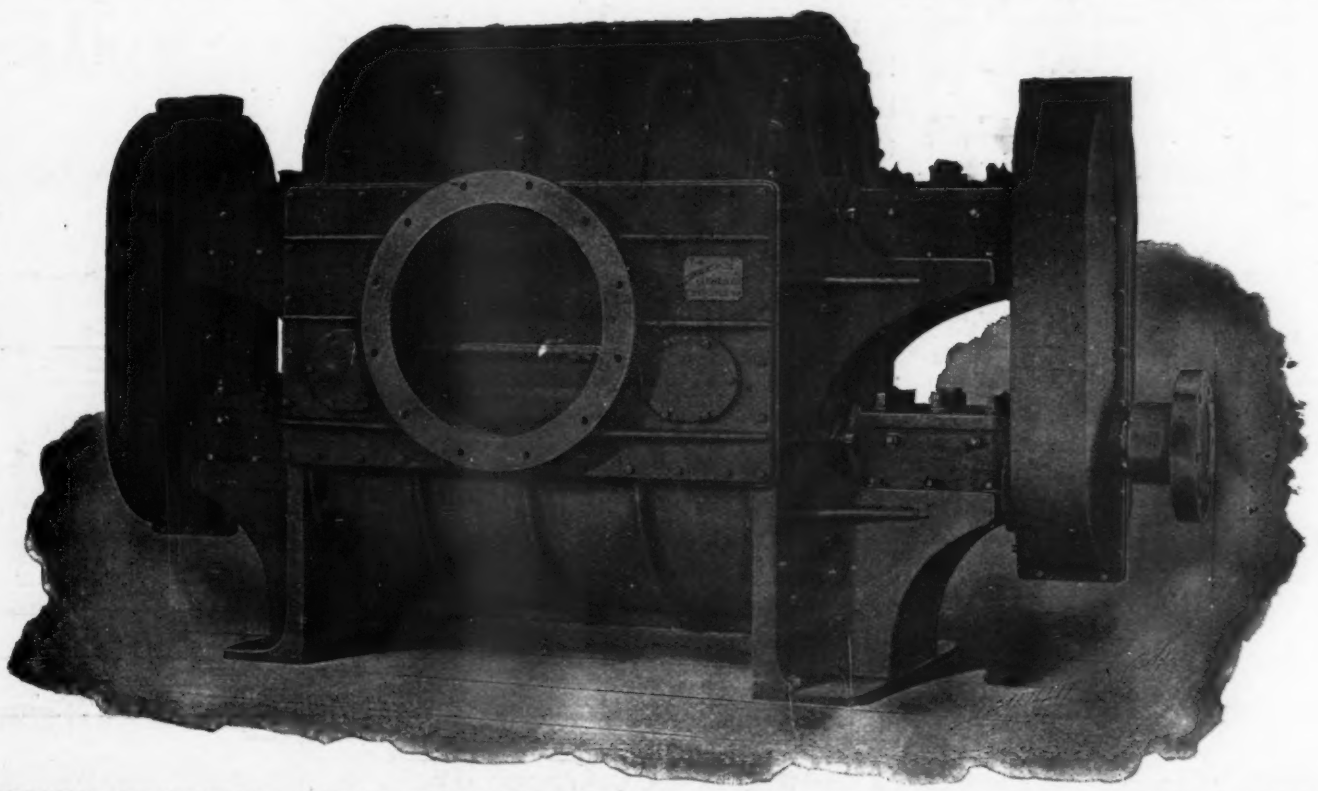

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